ARCHIVES OF OPHTHALMOLOGY.

SIMPLE EXTRACTION DOWNWARD.

By PROF. C. SCHWEIGGER, M.D., Berlin.

Translated by Dr. J. A. Spalding, Portland, Me.

(With two figures in text.)

THE beautiful results which v. Graefe obtained by linear extraction of soft cataracts in young people naturally excited his desire to employ the same method in senile cataract. But his results did not answer his high expectations. In his efforts to utilize linear extraction in senile cataract he went so far as to employ, instead of the so-called linear incision with the broad knife, an actual linear incision in a great circle with a narrow knife. Here he was acting on the supposition that the margins of such an incision, if left to themselves, unite closely with one another, and at the same time have but little tendency to separate. This was indeed an error, for, owing to the elastic contraction of the membranes of the eye, a genuine linear incision gapes more than any other that can be made upon the eye. This elastic force is, to be sure, the same with every incision, but with the lance section or with the flap section the breadth of the corneal wound is greater than the thickness of the cornea, owing to the obliquity of the channel of the incision. Therefore, without preventing contact at the margins of the incision, the elastic contraction of the sclera simply dislocates them laterally; the peripheral margin of the incision is drawn obliquely backward, and pushed slightly upward so that the incision situated toward the middle of the cornea, is pushed forward and the cornea flattened at right angles to the incision; in other words, traumatic corneal astigmatism results. With a

genuine linear incision the breadth of the margins of the wound is exactly equal to the thickness of the cornea, and the elastic contraction of the eye widens the incision, and is the cause of the frequent prolapse of vitreous—about 14 per cent.

It is no wonder that the loss of vitreous was then universally ascribed to the flap incision, for the true causes were unknown, and the promise that this would all be remedied when the linear incision was adopted was warmly welcomed. The illusion was brief, for, yielding to actual necessity, the peripheral incision was soon abandoned for a peripheral flap. With this development v. Graefe was far from satisfied, for a flap with even half a millimetre height was to him simply falling back into the worst of old, bad habits. For all of that, the power of facts was too strong to be resisted, the return to the old flap could not be restrained, and what people nowadays are pleased to call an operation according to v. Graefe is not his way of making the incision at all, but it is the very flap operation which he so bitterly opposed, and which in our days makes a flap 4 or even 5 millimetres high.

The same fate befell iridectomy. With a genuine linear incision the iris at once prolapsed throughout the entire extent of the wound, and was abscised with several snips of the scissors, into the extreme angles of the wound. The more the linear incision became a flap the more the need for any iridectomy ceased; it gradually became smaller and smaller, and was by many operators omitted.

If now the return to the flap operation developed so irresistibly, how did it happen that we stood still and paid no attention to the old flap incision too hastily thrown aside? No argument was ever brought against the usefulness of this well-tried method, and for myself I returned to it in 1887, and I operated as described by Richter a hundred years ago, at first upward, and ever since 1888 downward, having satisfied myself that that is the best way of all. I did not operate at once on every case with a flap incision in the margin of the cornea and without the iridectomy, but about half of my cases with a peripheral flap incision upward and with iridectomy. The results that I have obtained by operating

with and without iridectomy have been detailed in these ARCHIVES,[1] the tabulated results of which I now state for the sake of comparison:

	With Iridectomy.	Without Iridectomy.
Good results,	278 = 75 per cent.	346 = 76.5 per cent.
Secondary cataract,	71 = 19 "	84 = 19.1 "
Losses,	22 = 6 "	20 = 4.4 "

These statistics, supported by a sufficiently large amount of material, proved that secondary cataract and losses are not less in the operation with iridectomy than without it. But a point which struck me as very pertinent was the amount of vision obtained, for which hospital patients were not wholly suitable as tests. The amount of vision obtained when the patient is discharged is no criterion, for the sight regained in three or four weeks is not the best, some months being generally needed. Rarely, however, can we follow patients so long; they either never return or we lose track of them in the crowds at the dispensary. For these reasons I determined to base my next statistics on private patients, all of whom I tested before and after the operation, on whom I personally operated, and whom I had an opportunity to test for many months afterward and in some cases for years. Very few, if any, have ever fully disappeared from view, and a final point on which emphasis is to be laid is the greater average intelligence of private patients, in comparison with that of those in the clinique.

It is remarkable that the assertion that the operation with iridectomy gives as good vision as simple extraction should be universally believed. Nevertheless it is universally known that in loss of sight from irregularity in the refracting media of the eye, vision is improved by contracting the pupil. The improvement of the sight by the stenopæic slit is only due to the fact that diminution of the pupillary space diminishes the circles of dispersion. The same thing is true in operations for cataract. So long as correcting glasses are not worn, it is a matter of indifference whether the pupil is small and round or large and irregular, for the circles of dispersion are so colossal that the form of the pupil is indifferent. But when glasses are used it is a

[1] Vol. xx., p. 303.

different matter. For owing to lack of accommodation the eye is only arranged for a single distance; everything that lies farther away or nearer appears in circles of dispersion which are so much the smaller, the smaller the pupil.

The proof of the advantages of a round pupil can only be afforded by tests of vision, but it is not a question of collecting the visual tests of different observers, because there is no uniform method. One prefers dots, another hooks, and even if all made use of Snellen's types there is no uniform method there.

"A test of vision is also a test of intelligence," said Donders, only we cannot fix its exact percentage in our patients. More than that, psychical influences are at work, for, according to their bodily or mental condition, patients are able to give more or less attention to the tests that are made. "Yes, I can see it, but it strains my eye," is a remark often heard when we ask a patient to see one more row of finer types than the one easily seen. Hence for every correct test of vision a certain effort is demanded.

Furthermore, the illumination used in testing the sight is of great importance. Every cloud that passes over the sun reduces the amount of sight for the time being. Artificial illumination is more even than daylight, but it is difficult to carry out all our tests in that manner.

All of these considerations show that when we test our patients at different times we may get different results, and in patients on whom extraction has been done these variations from one day to another are considerable. It often occurs that patients who seem to have a reasonably good vision ($\frac{1}{4}$ to $\frac{1}{2}$) for distance, cannot, when tested for near vision, and even with apparently suitable lenses, decipher the largest printed matter. Occasionally the case is inverted, and reading is excellent but distant vision poor.

Then again some patients can see at 5 *m* distance all the letters of No. 10, some of No. 7.5, and one or two only of No. 5. Is this vision 0.5, or 0.66, or 1?

Finally, to complete this section of my paper, I will say that, without intending to exaggerate statistics, I have arranged my results into groups, as follows:

I. $V = \frac{1}{2} - 1$
II. $V = \frac{1}{4} - \frac{1}{2}$
III. $V = \frac{1}{7.5} - \frac{1}{4}$
IV. $V = \frac{1}{15} - \frac{1}{7.5}$
V. $V = \frac{1}{30} - \frac{1}{15}$

These statistics are based on *all the cases of senile cataract* which I personally operated on, partly with and partly without iridectomy, in my private hospital from 1888 to 1895, and most of which were subsequently examined by myself for a long time afterward.

These amounts of vision are generally based on tests made about three or four months after the operation. Thus, in the group of 54 simple extractions without a secondary operation, all of them belonged to this group at the first test, three or four weeks after the operation, but 12 of these later had vision less than $\frac{1}{4}$. On the other hand, a later diminution by secondary cataract is never excluded.

	194 Extractions with Iridectomy.	208 Simple Extraction Downward.
I. $V = \frac{1}{2} - 1$,	9 cases = 4.7 %	54 cases = 26 %
II. $V = \frac{1}{4} - \frac{1}{2}$,	68 " = 35 %	93 " = 44.2 %
III. $V = \frac{1}{7.5} - \frac{1}{4}$,	54 " = 27.8 %	35 " = 17 %
IV. $V = \frac{1}{15} - \frac{1}{7.5}$,	20 " = 10.3 %	7 " = 3.4 %
V. $V = \frac{1}{30} - \frac{1}{15}$,	9 " = 4.7 %	0
	Pre-existing Complications.	
VI.	18 cases = 9.2 %	6 cases = 3 %
	Losses.	
VII.	7 cases = 3.6 %	5 cases = 2.4 %
	Imperfect Observations.	
VIII.	9 cases = 4.7 %	8 cases = 4 %

The first glance at these figures shows that the unjustly condemned simple extraction downward, as performed a hundred years ago, gives better results than any of our present methods.

All of these cases enumerated under VIII. are not to be added to the losses *in toto*, but some went home before proper tests of vision could be made and never returned. Two of these, representing three extractions, were in exceedingly senile individuals between eighty and ninety years of age. Two died from apoplexy within a week after the operation.

Group VII. shows no essential differences between losses after extraction with iridectomy or without. There were seven losses *with iridectomy*.

The *first* case was loss of the eye from purulent irido-choroiditis arising on the fifth day after the operation.

The *second* loss was in a highly myopic eye. Vision was $\frac{1}{15}$ six weeks after the operation, but the irido-choroiditis, already present, gradually led to blindness.

The *third* case might have been reasonably included in the complicated list, owing to the need of an operation for removal of an iris cyst two years before extraction. The latter operation was normal, but vision was gradually lost from dense vitreous opacities. Three months after extraction the optic and ciliary nerves were resected owing to violent pain associated with choroiditis.

Case *four* was dismissed with vision of $\frac{1}{7}$, but irido-choroiditis and opacities on Descemet's membrane caused final blindness.

Case *five* was in a female patient with *diabetes*, in whom iritis with opacities on Descemet's membrane began two weeks after the operation, and caused blindness.

The remaining two eyes were lost by unruly behavior of the patients occasioning an abnormal operation.

The five losses in cases operated on *without iridectomy* may be thus classified:

One case of *suppurative infiltration of the incision two weeks after the operation, probably by auto-infection.* The case terminated in dense corneal opacities.

The *second* case was in a female patient who had for a long time been treated for nuclear cataract with atropine, producing granular atropine-conjunctivitis. The other eye had a cataract which was operated on with iridectomy, owing to extreme myopia. The operation and after-course were normal. The second eye was irrigated abundantly with sublimate, and protected with a sublimate bandage for a week, and then operated by simple extraction about eight days after the first eye. Five days later purulent infiltration of the incision appeared, with gray exudate into the anterior chamber. Panophthalmitis. The conjunctival follicles had probably served as an asylum for the pyogenic elements.

The remaining three cases were due to complications; *one* in a *diabetic patient* with a normal recovery; but two

weeks later iritis ensued and terminated in blindness from irido-choroiditis. The *second eye operated upon later with iridectomy followed the same course.*

The *second* case had *intraocular hemorrhage after abscission of a prolapse of the iris.*

Although intraocular hemorrhage after extraction is rare, there is no reason why it should not also occur after removal of a prolapse of iris; possibly the intraocular hemorrhage occurred before this was done.

The *third* case was operated normally, but was followed by pain, lachrymation, swelling of the lids, and so on. Eight days after the extraction prolapse of iris occurred, which was snipped off. The anterior chamber never filled again, and the case terminated in irido-choroiditis.

The pre-existing complications (Group VI.) were generally determined before the extraction, but the wish of the patient to try the operation always prevailed, despite the condition of the eye. The complications were, retinal detachment in four cases, luxation of the lens in three (two of which were traumatic with increased tension, and one congenital with cornea globosa), six of irido-choroiditis (one patient having this condition in both eyes), two of glaucoma in one patient who had previously submitted to a classical iridectomy, two of trachomatous pannus in both eyes, and one of congenital cataract.

In the nine cases in Group V. of extraction with iridectomy and vision between $\frac{1}{35}$ and $\frac{1}{15}$, three were tested three or four weeks only after extraction and never reappeared, so that the final vision cannot be accurately determined. In one case vision was affected by a previous glaucoma, and in another there was a dense secondary cataract, the needling of which was declined by the patient. Two cases of unsatisfactory vision were due to irregular astigmatism of the cornea, from prolapse of iris into both angles of the incision.

The twenty cases with iridectomy in Group IV., with vision between $\frac{1}{15}$ and $\frac{1}{7\cdot5}$, embrace five in which vision was tested three weeks after extraction, the patient never returning; four with pre-existing complications, two of extreme myopia with alterations at the macula, one of retinal detachment

with albuminuria and diabetes, and one of congenital amblyopia. Four other cases showed unoperated secondary cataract, and two more had irregular astigmatism from cicatricial contraction of the iris in the angles of the incision. Finally, five cases of secondary capsulotomy resulted in only this amount of vision being obtained.

Of the seven cases in this group with *simple extraction*, four did not remain long enough under observation to enable a definite result to be obtained; two declined a secondary capsulotomy, and one disappeared from view with astigmatism after prolapse of iris.

In order to form a correct judgment of the results obtained by either operation, *we must not forget that the number of cases with complications was much larger in the operation with iridectomy than in simple extraction. Therefore, excluding all complicated cases, and losses*, we arrange the vision obtained in five broad groups as follows:

	With Iridectomy, 160 cases.		Simple Extraction Downward, 189 Cases.
I.	$V = \frac{1}{2} - 1$	9 cases = 6 %	54 cases = 29 %
II.	$V = \frac{1}{4} - \frac{1}{2}$	68 " = 42 %	93 " = 49 %
III.	$V = \frac{1}{7.5} - \frac{1}{4}$	54 " = 34 %	35 " = 18 %
IV.	$V = \frac{1}{15} - \frac{1}{7.5}$	20 " = 12 %	7 " = 4 %
V.	$V = \frac{1}{85} - \frac{1}{15}$	9 " = 6 %	

Here again we see that in simple extraction downward the good results far surpass those obtained by other customary methods.

The old-fashioned, simple extraction downward with a flap just inside the corneal limbus and embracing nearly one half of the cornea not only gives better visual results than the peripheral section upward, but the method of operating is preferable. If we must operate with iridectomy, the upward incision is the best, in order to cover the enlarged pupillary field with the upper lid. But the advantages of a small, round, central pupil are not obtained in that way. If we wish to operate by simple extraction, there is no tenable ground for the upward incision at all. It was formerly argued that by making the incision upward the margins of the incision were kept in more accurate apposition by the upper lid, and that recovery by first intention could not be

so easily prevented by the restless behavior of the patients, or by contact of the margin of the lid with the flap. This is, however, an illusion, for when the lids are closed the eyeball rolls upward to the extreme physiological degree, so that the whole cornea lies beneath the upper lid, as any one can convince himself by observing a case of paralysis of the orbicularis. Upward rotation of the eye is not a muscular effect, but an elastic force, for it appears equally in sleep, at the moment of death, and whenever during surgical narcosis muscular innervation ceases. In discussing cases of squint with deviation upward, and the secondary deviation equally upward, I have pointed out[1] that this can be due to nothing except an elastic force, for any movement which is in opposition to the laws of muscular innervation cannot be due to the muscles at all. And as I remarked in the same place, anatomical investigations in this respect are much to be desired.

The same upward rotation also occurs on closing the eyelids after an operation, so that in the fissure between the lids lies a considerable portion of the *sclera* below the lowest portion of the cornea, whilst the entire *cornea* is wholly concealed beneath the lid. Many patients, for instance, are unable during the dressing of their eyes after downward extraction to roll their eyes downward at all, and we cannot see either the incision or even the cornea. Under such circumstances it is not advisable to pull the eye down with forceps, because it may reopen the incision and cause prolapse of iris, or vitreous, or both. But generally speaking, with a downward incision it is easy, though not possible in every patient, to watch from beginning to end the condition of the eye.

It often happens in simple extraction upward that patients cannot possibly look down, the eye flying up at the least touch with instruments, so that during the incision and the entire operation the eye must be pulled into view by forceps, a procedure which is prejudicial to a correct performance of the operation. For this reason many operators long ago abandoned the upward incision and made a combined ex-

[1] These ARCHIVES, vol. xxiv., p. 8.

traction downward. If, during simple extraction downward, the eye rolls up, no harm ensues, for the horizontal meridian of the cornea remains in sight in the aperture of the lids, widened, too, as it is by means of the speculum.

A smooth operation is only possible in patients who can control the innervation of their ocular muscles, but under any conditions the incision upward demands more from the patient than the incision downward.

I make the incision with a broad knife (Richter's), sharp on both edges to about 2 *mm* from the tip, the back straight and thin, but not cutting, and the surfaces of the blade a trifle convex. The width of the blade increases gradually from the point, so that at about 15 *mm* from the latter it is 6 *mm* wide and remains so up to the base. The edge is not straight, as in Beer's knife, but a little curved. The advantages claimed a hundred years ago for this knife, corresponding as it does to the height of the flap, keeping the incision closed until finished, preventing too early escape of aqueous, and completing the incision from beginning to end without the need of sawing, are true to this day. If, occasionally, a slight bridge of cornea remains undivided by the advancement of the blade, it can be easily completed in the withdrawal. The point is inserted at the inner border of the limbus corneæ, just beneath the horizontal meridian, and pushed straight across, the blade parallel to the base of the cornea, so that the entire incision lies in the inner border of the limbus. The pressure of the hand falls on the back of the knife during the incision, in order to keep the wound closed.

It has been claimed for the narrow knife that one can at any moment alter the plane of the incision, and give the various forms, but that is not an advantage at all, for every alteration in the plane of the incision gives it an irregular form, and increases the corneal astigmatism.

Fixation is done for simple extraction downward, not with forceps but with an instrument shown in Fig. 1, a sort of two-pronged fork with buttoned ends 4 *mm* apart. The forks prevent rotation or deviation of the globe, and permit a useful support against the knife in finishing the incision.

After completing the incision the speculum is removed and no further fixation is employed. I used the ordinary capsulotome, but capsule forceps when a capsular cataract is present. If the cortex is soft I often remove the

FIG. 1.—Schweigger's Fishing Fork.

lens in the capsule. The lens is delivered by pressure on the upper portion of the cornea with a spoon. In doing this the equator of the lens has to rest over the pupillary margin, but, as in simple extraction upward, the iris does not often offer much resistance to this step. Any remaining cortex is removed by gently stroking the cornea itself, or by the introduction of a small spoon. I have no hesitation in introducing disinfected instruments into the eye. It is only now and then that the cleansing of the anterior chamber is obstructed by collapse of the cornea, which prevents us from seeing clearly, but even in such an event the downward incision has its advantages. For, with an upward incision the eye must be rotated downward with the forceps in order to spoon out between the upper lid and the incision those cortical masses which cannot be easily stroked out; even if iridectomy has been made, more cortex remains behind, owing to the difficulties in removing it, than in simple extraction downward.

The peripheral section has no advantages over the old one in the inner border of the limbus. No one now believes that the scleral tissue is less accessible to germs than the cornea. Besides that, only the extreme surface of the incision lies in the sclera, the greater part being in the cornea. So, too, the unavoidable conjunctival flap, in peripheral section, offers nothing but disadvantages. The assertion so often made, that it prevents an invasion of bacteria, is an illusion, as statistics show. My former statistics were: 5.7 per cent. of losses after iridectomy, and by simple extraction, only 4.4. My latest figures are: with iridectomy 3.6 per cent. of losses, and without, only 2.4. So that taking my 1223 cases we find 5 per cent. of total losses with iridectomy,

and only 3.8 per cent. without. All of my operations with iridectomy were done with a peripheral incision and a conjunctival flap, and of my simple extractions within the cornea, almost all of them downward and without the least trace of a conjunctival flap. So that, so far as my experience goes, there is no advantage in a conjunctival flap.

Then again, so far as concerns *a loss of vitreous*, the downward section offers great advantages over the peripheral upward section, because the more peripheral the incision the easier the escape of vitreous. Moreover, the most frequent cause of this escape being extraocular tension, the incision downward is to be preferred. It may happen that patients, by unconsciously nipping the lids together directly after completion of the section, will extrude the lens in its capsule, but that we cannot prevent. In one instance of this sort in a Morgagnian cataract, I noticed the conical form of the lens as proof of the influence which the elasticity of the capsule exerts, in the process of accommodation. Loss of vitreous is mostly seen in myopic eyes, but the fluid which is lost is not vitreous, but a liquid contained in the vitreous chamber. The enlargement of the eye in extreme myopia is not due to an increase of normal vitreous, but to a fluid, probably secreted by the ciliary body, collecting first at the posterior pole between the retina and vitreous, but in extreme myopia surrounding the entire vitreous body, and easily escaping after removal of the lens. A frequent consequence of loss of vitreous is tilting backward of the iris. It looks just as if an iridectomy had been performed, and the optical effect is the same. The best remedy for such an accident is eserine, which by contracting the sphincter may bring the iris back into place.

The after-treatment is the same with iridectomy as without. I generally bandage both eyes, but the bandage must not press upon the eye. If we bandage only one eye, the protecting pad is usually found next morning lying on the temple or forehead. Occasionally I use no other covering than strips of plaster to hold the protecting pad in place.

The bandages are changed on the day after the operation,

and the lids thoroughly cleansed. There is generally so much secretion that it is necessary to change the bandages daily. I never make a forcible examination of the eye. If the patient cannot open the eye, it is left closed. Atropine can be used, by simply dropping it on the fissure between the lids. After a few days most patients can open the eye wide enough for inspection, and in this point of view the downward incision is most advantageous. I no longer insist on absolute rest in bed, iridectomy or not. Cautious and slow movements about the bed are permissible, and the patient sits up on the third day, or sooner if all is favorable. Finally, the duration of the case, with or without iridectomy (about three weeks), is the same in all cases.

By secondary cataract, we mean one of two distinct things—remnants of cortex, or thickening and opacification of the capsule. Both can occur together, and, additionally, both can be complicated with iritic changes. Cortical remnants occur oftener in the operation with iridectomy upward than in simple extraction downward, because the downward section facilitates their removal. However, I cannot recall any harm from leaving remnants in the anterior chamber. They generally absorb in the course of a few months, presupposing that recovery is not complicated with iritis, which I think does not occur more often when remnants of cortex are left behind than when they are removed during the operation. The condition of affairs is, however, different when a hard nucleus remains, which should never occur with a good operator.

It is well enough to say that cortical remnants may serve as a subsoil for germs, but that is a matter of slight importance in comparison with the better soil furnished by the vitreous. It is ten years ago or more that I explained on this basis the absence of suppuration after iridectomy alone, and its presence when we add to iridectomy an extraction of the lens.

A genuine secondary cataract depends on thickening and opacification in the capsule of the lens, visible in the eye even in the early weeks after extraction, though in many instances not until some months later. Furthermore

a secondary cataract may be additionally thickened by iritic exudations.

Up to within a short time, I used **Bowman's double needle operation in secondary cataracts,** the needles being rather broad and two-edged. The point was sharp, and, about 2 *mm* off, widened to 2 *mm* in breadth. These were pushed through the margin of the cornea, right and left, or directly upward and downward as the case might be, met in the centre of the capsule, transfixed it, and then an opening was made by approaching the handles together. In this way, the reproach of the secondary operation (traction on the ciliary body) is avoided, the secondary cataract being pulled toward the ciliary body rather than away. The operation is generally slight, the recovery almost always rapid, but in about fifteen per cent. of the cases it is followed by a disagreeable and tedious irritation, which may last for weeks and months, with slight corneal opacification, injection of the eye, photophobia, lachrymation, and so on, but without apparent iritis, for the pupil responds normally to the use of atropine. This inflammatory process must be in the ciliary body. I never have seen during its continuance deposits on Descemet's membrane. In one case in which the irritation persisted for months, I resorted in vain to iridectomy. The process continued several months, nearly a year in all, and then, as in all of my cases, gradually ceased. This case also demonstrated that the corneal turbidity disappears when the eye is bandaged, but reappears when the bandage is removed and the eye left to itself. All of which proves that the turbidity is due to œdema of the cornea. I have seen the same condition in a few cases of fresh glaucomatous inflammation.

Bowman was the first observer to call attention to the occurrence of glaucoma after discission. I have never seen but one case of this sort from the double-needle discission (actually the last that I performed by this method), but it was bad enough. The secondary thickening did not appear until a year after extraction, and within a few hours after needling a violent attack of inflammatory glaucoma ensued, although no symptoms of glaucoma had ever before been seen in this eye.

The occurrence of glaucoma after discission is just as inexplicable as any case of glaucoma that ever occurred, but what can the chamber-angle theorists say to this undeniable fact?

The desire to find some substitute for the needle operation is well founded, and has long been felt by every operator. In 1894, Siegrist[1] reported a case in which the capsule was divided with de Wecker's scissors, and Esberg[2] has recommended smaller iridotomy scissors. About two years ago I had similar scissors made, as shown in the appended figure:

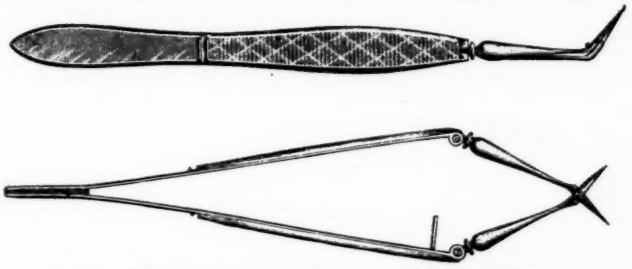

FIG. 2.—Schweigger's Forceps-Scissors. Side and Front View.

The anterior chamber must be opened first to afford entrance to the scissors, but the incision must be very small, for in aphakia every incision in the cornea, no matter how minute, even if made with the broad needle for discission, may be followed by incarceration and escape of the vitreous through the wound. Division of secondary cataract with these scissors has the advantage of permitting with the left hand focal electrical illumination of the field of operation. I have employed electric light in the double-needle operation, but in such cases we cannot hold the light in our own hand in order to illuminate the exact spot which we wish to divide. The instrument itself is simple—an electrical lamp fed by a movable accumulator with a convex lens of about 1½ *cm* focus. The greatest advantage is that the light can be brought to any desired point, and I use it on every suitable occasion.

[1] SIEGRIST, "Ciliary Processes in the Pupillary Space." These ARCHIVES, vol. xxvi., p. 243; Germ. Ed., vol. xxxiii., 1, p. 110.

[2] ESBERG, H., "Zur Operation des Nachstaars." *Zeh. Klin. Monatsbl.*, 1895, p. 249.

I have used these scissors in every case of capsular cataract since 1895, and have been pleased with the entire absence of irritation, slight attacks of iritis dependent on individual peculiarities excepted.

There is but one sort of secondary cataract in which the double-needle operation is the best, namely, for cases of severe iritis with closure of the pupil by pseudo-membranes. Such cases are rare, and they occur as well after extraction with iridectomy as after simple extraction. If iridectomy has been made, I make a new one. If simple extraction has been performed, with preservation of a round pupil, the double-needle operation after perfect cessation of inflammation is the best, the exudative masses being torn apart and a round, clear pupil is left.

Indications for iridectomy in extraction are rare. They are: anterior or posterior synechiæ, owing to which the exit of the lens through the pupil will be obstructed; luxation of the lens, in order by enlarging the pupil to facilitate grasping the lens with a loop; complications with glaucoma; and finally, all cases in which, for proper reasons, anæsthesia must be employed. Whenever iridectomy is necessary, the incision should be upward, but even then I use a knife, as for simple extraction downward, only about 4 *mm* wide.

The frequency of prolapse of the iris in simple extraction being held up as an argument in favor of performing iridectomy, we must first consider from our statistics the cause, course, and sequelæ of this accident.

Prolapse of iris occurred 26 times (thirteen per cent.) in 208 cases of simple extraction.

Group I., with vision from $\frac{1}{2}$ to 1, had 4 cases of prolapse requiring abscission. In other words, 54 cases with excellent vision had seven per cent. prolapse. The accident occurred three times soon after the operation in patients who, during the operation, had exhibited extreme muscular contractions about the eyes, and in 1 case five days after the operation from pressure on the eye. Abscission was done in from one to ten days after discovery of the prolapse.

Group II., with vision from $\frac{1}{4}$ to $\frac{1}{2}$, had 9 cases of prolapse, of which 3 are specially interesting.

CASE 1.—Mr. C., aged sixty-three. Simple extraction downward, Nov. 3, 1891. Discharged with round pupil and vision $\frac{1}{3}$. Three weeks later he returned with iritis, exudation in the pupil, and a small prolapse at the inner angle of the incision. He thought he had pressed on the eye. The prolapse was abscised. *This accident occurring two months after extraction shows that the incision may reopen even at that late date.*

The same thing may occur with the peripheral section and a conjunctival flap. A patient who had been operated on with simple extraction upward, but with a large conjunctival flap, and who was discharged with a round pupil, returned several months later with a subconjunctival prolapse, which, as it caused disagreeable sensations, though no inflammation, was abscised.

CASE 2.—Had both eyes operated on at the same time; one eye simple extraction downward, and the other eye a double-needle operation. Unfortunately, acute glaucoma ensued in the needled eye on the following day, and caused a prolapse of iris.

CASE 3.—Mr. W., aged forty-five. Very myopic. Examination in 1887 showed V with − 20 D S $\frac{5}{36}$. In May, 1888, semi-mature cataract. Extraction, July 11, 1888. Unruly patient, but the iris was finally left in a normal situation. For ten days nothing could be seen of the globe, as it remained constantly rolled upward. On the eleventh day a small prolapse was seen, and immediately abscised without loss of aqueous. The latter fact proved that the abscission had been needless, and with my present experience I should let such a prolapse alone, and wait for probable shrivelling. Five years later, vision $\frac{5}{15}$ to $\frac{5}{10}$. The other eye was operated on with iridectomy in 1896 to avoid prolapse, but the vision was less satisfactory than in the other eye, despite the prolapse.

Of the remaining 6 cases, 5 occurred in from one to four days after the operation, owing to violent coughing, restless behavior, etc., and in one instance owing to a blow on the eye.

Group III., with 35 cases of vision from $\frac{1}{7.5}$ to $\frac{1}{4}$, had 5 cases of prolapse. Three of these occurred four days after extraction from coughing and restlessness, and one from straining at stool. In one case, finally, after normal simple

extraction downward, the patient, who was still in bed, was attacked with a violent chill, which, even if the eye had been operated on with iridectomy, would have produced a prolapse into the angles of the incision.

Group IV., with vision from $\frac{1}{15}$ to $\frac{1}{7.5}$, contains 2 cases of prolapse, once after coughing, the patient also having accidentally hit his eye during the night. Abscission was impeded by the patient refusing anæsthetics, and then by squeezing his lids together and acting in every possible manner to injure the recovery. In the second instance the visual test was made on the tenth day after the abscission, so that the result is not yet final.

Group V., of 6 complicated cases, contains 1 of prolapse from vomiting five days after the operation.

Group VI., with 5 losses, contains 3 prolapses, 1 of which was due to suppuration of the corneal section. The second case was a small prolapse on the day after the operation, but not abscised for ten days. When the bandages were renewed the next morning intraocular hemorrhage was observed, and may have occurred directly after the extraction, but did not make its way outward until after removal of the prolapse. Such rarities cannot be statistically valued. So, in the third case, violent inflammation set in directly after the extraction, and prolapse occurred on the eighth day. Three months later hemorrhage into the anterior chamber and opacification of the entire cornea.

Group VII., imperfect observations, contains 2 cases of prolapse; 1 being due to coughing eight days after the operation. In the second case the left eye had already been successfully operated on by simple extraction, but the right eye after a good simple extraction downward had a prolapse on the fourth day. Considerable irritation ensued after the abscission, but the eye was gradually improving when the patient withdrew from further observation.

Let me remark at this place that I have only included cases of prolapse in which abscission was necessary. Two other cases of prolapse, the size of a pin-head, were flattened by cicatrization so that only a small synechia remained. Vision in one was 1, and in the other $\frac{1}{2}$.

All statistics of the frequency of prolapse of iris should include only those cases in which the accident disturbed the recovery of the eye, and had to be abscised. Therefore some of my cases ought to be excluded; as, for instance, Case 1, in Group VI., in which the disturbance in recovery from the operation was due to infection of the wound, which was then the cause of the prolapse. So, too, in Group II., Case 1, the patient was discharged with a round pupil, and only reappeared some months later with a prolapse from an injury. Finally we should exclude several cases in which the prolapse was so small that with my present experience I should not have abscised it at all, but left it to smooth over spontaneously. If this system were universally followed the percentage of prolapse in simple extraction downward would be reduced to 10.

It does not seem to me as if the often-used term "inclination to prolapse" meant anything. In simple extraction downward well performed, the iris can always be replaced. Prolapse is something occurring later, and is always due to extraocular increase of pressure from force, or increased muscular spasm, or pressure in the orbit from vomiting or coughing. This it is which reopens the wound, and the aqueous or vitreous pushes the iris forward and out. All of these things may happen and yet there will be no prolapse. I have known patients to vomit, or in their delirium to tear off their bandages, or to scream at the top of their voice, or to get out of bed and run to and fro, yet go home without a sign of a prolapse.

There is no reason why we should make an iridectomy simply from fear that the iris will prolapse, because prolapse is neither so frequent nor so dangerous as is often affirmed. It is indeed true, as I remarked at the Heidelberg Congress, in 1888, that a piece of iris once excised cannot prolapse, but that does not prevent frequent anterior synechiæ in the angles of the incision, nor even an occasional prolapse at the same spot.

Every inclination for prolapse in simple extraction may appear after the operation with iridectomy. Here we include every case in which the iris tissue in the angles of the

incision protrudes through the cicatrix. The fact that these prolapses are mostly beneath the conjunctiva, does not alter the situation. As far back as v. Graefe's time, prolapse with iridectomy was observed and lamented, owing to the necessity for abscission. v. Graefe insisted on snipping off the iris with several motions of the scissors, and into the extreme angles of the incision, but no one does that nowadays, and it remains as true now as thirty years ago, when v. Graefe said it, that "small prolapses into the temporal angle of the incision are not uncommon, and incarceration of the iris in the inner aperture of the wound is frequent."

The 194 cases of extraction with iridectomy showed 16 prolapses, and in 3 patients there was prolapse into each angle of the incision, making in all 19, or about 10 per cent., so that prolapse with the combined operation is about as frequent as in simple extraction downward, only that there is no need for abscission, as it causes no trouble. Anterior synechiæ remain after abscission of a prolapse, but that occurs in a majority of cases in the combined operation.

Prolapse of iris is oftentimes quite a different thing in the combined operation upward from what it is in the simple extraction downward; because it generally occurs during the operation. The patients in whom it is observed are mostly those who have no control over the eye, so that it has to be pulled downward with forceps. Such a pressure outside the eyeball may cause extrusion of the vitreous, sometimes with, and sometimes without, prolapse and incarceration of the iris. Reposition of the iris is prevented by the same causes that produced the prolapse. Therefore, after closure of the incision the aqueous collects once more, the incarcerated iris is pushed still farther into the angles of the incision, and prolapse is at hand.

Furthermore, prolapse of iris produces irregular curvature of the cornea and distorted retinal images, whilst in simple extraction this condition is diminished by the small round pupil. Thus in our list of 54 cases with vision from $\frac{1}{2}$ to 1, there were 4 of prolapse, or about 7 per cent. When iridectomy is done such a correction is lost and the unsatis-

factory results in Groups IV. and V. were chiefly due to irregular astigmatism following prolapse of the iris.

Anterior synechiæ, that is to say, incarceration of the iris, are more frequent in the operation with iridectomy than in simple extraction, because the elastic power of the iris in the latter retracts it from the incision. In iridectomy the contractile power of the sphincter of the iris is destroyed, and careful investigation generally shows that the corners of the sphincter are not in their normal position, but that one or the other is drawn upward, proving the existence of anterior synechiæ. Nevertheless, the defenders of iridectomy considered synechiæ a permanent source of danger. v. Graefe said that "every anterior and posterior synechiæ is a permanent source of danger and that it only depends on individual differences of irritability and a series of incalculable casualties whether such danger becomes mischievous or not." This can be said, indeed, of every pathological alteration remaining in the eye from any cause. There is no doubt that an eye with anterior synechiæ may fall a prey to some other disease, but we cannot hold the synechiæ responsible for everything that happens after it has once formed. An outbreak of glaucoma in an eye with anterior synechiæ does not prove that the former originated in the latter. Such connection could only be proved statistically, but glaucoma and anterior synechiæ occur so often singly, and so rarely combined, that actual connection between them has not yet been proved. So, too, with other intraocular inflammation. Swanzy, for example, reported[1] three cases of suppurative iritis in eyes with synechiæ, but in one the synechiæ had been present for twenty years, and in the other two there was no proof that the synechiæ and nothing else were the cause of the inflammation, for suppurative iritis is often observed, without apparent cause, in eyes that show no synechiæ at all.

So, too, suppurative choroiditis is a rare disease, but it is seen as well in eyes without synechiæ as with. All of the cases of this affection that I have observed in eyes with synechiæ started as an intraocular inflammation, not as inflam-

[1] *Nagel's Jahresbericht*, 1871, p. 249.

mation or suppuration of the corneal cicatrix. Cicatricial infection cannot always be denied, but the actual presence of bacteria in the cicatrix does not prove that they entered from without. Moreover we have cases of genuine corneal abscess (often associated with hypopyon), yet the epithelium is absolutely normal; in other words, endogenous infection was the cause.

I cannot grant the truth of the assertion that cicatrices with anterior synechiæ often become fistulous. Corneal fistulæ are rare, and have never yet been shown to produce purulent intraocular inflammation. It is true that eyes which have maintained a prolapse of iris after extraction have ultimately gone to ruin from intraocular inflammation, but that does not prove that the prolapse was the cause, for if so, such results would be much oftener met with.

Here is a case in point: Mr. K., aged fifty-nine. Extraction with iridectomy, July, 1892. Vision $\frac{1}{2}$. There was a small subconjunctival prolapse at the outer angle of the incision. He returned two years later with a delicate secondary cataract, and the prolapse unchanged. Two years later acute choroiditis ensued and the eye was lost. Enucleation was not performed, as no indications for such an operation appeared.

However, all such cases are rarities, and have no actual connection with prolapse or with anterior synechiæ.

It is impossible to prevent every prolapse of iris after cataract extraction. Eserine is of but little effect, because its action has mostly disappeared at the time that the prolapse occurs. More than that, the contractional power of eserine over the sphincter is nothing in comparison with the power of an extraocular pressure which reopens the incision.

From time immemorial efforts have been made to reduce the number of prolapses. I tried a **corneal suture** 27 times in succession in one month, but the result was 3 prolapses which had to be abscised, 3 smaller ones which were left to themselves, 3 cases of severe iritis, and some attacks of keratitis starting from the sutures. I then abandoned corneal sutures.

In 1896 I returned to the peripheral incision upward, in-

tending to loosen the conjunctival flap partially, but not wholly, to let it remain to support and hold in place the section, the lens to be extracted sideways below it. But who can think of anything smart or stupid that nobody has thought of before! On consulting my books I found that Desmarres had done the same thing in 1851.

The first case that I tried went finely, the patient was quiet, the lens came out nicely, slipped out sideways beneath the conjunctival bridge, and the result was excellent. But in restless patients this bridge is an obstacle to the entrance of the capsulotome, it obstructs the exit of the lens, and especially the reposition of the iris if a prolapse is caused by unruly movements of the patient. Then I tried to make a broad conjunctival flap, and sutured it after the extraction. But even that did not prevent prolapse.

It was said at the Ophthalmological Congress at Heidelberg, in 1888, that iridectomy was a safety-valve. This sounds odd when we think that a valve should open in case of danger and close when danger has passed. A valve that does not close again is not a valve at all. An iridectomy may grant full flow to the aqueous when in the course of recovery there is need to open the incision, but nevertheless a prolapse of iris into the angles of the incision can still occur. My next idea, therefore, was to **substitute for the iridectomy an opening in the iris,** that remains open during the beginning of the recovery, and in case of reopening of the section lets off the aqueous, but again closes. This purpose can be accomplished by a peripheral split in the iris near and parallel to its insertion.

After repeated experiments I now operate as follows: The incision is made downward, the capsule opened, and the lens delivered. Then, in order to operate without pain, and consequently without reflex contractions of the ocular muscles, tropococaine is introduced into the anterior chamber, and after three minutes, by which time complete anæsthesia is obtained, the iris is pulled forward with fine forceps and divided with a suitable knife close to the corneal incision. I tried to do this at first without local anæsthesia, but it proved impossible to do it with nicety owing to reflex con-

tractions of the eye muscles. A broad needle is pushed as peripherally as possible through the iris, and the incision widened toward each side extensively. It is quite important that the corneal incision should lie close to the limbus, otherwise the incision in the iris does not fall near enough to its insertion. In order to prevent prolapse the incision in the iris should be extensive, which is not done in the small peripheral iridectomy suggested by Pflueger for the same preventive purpose.

The iris should not be incised before the delivery of the lens, because then the latter is pushed forward through the opening, a step which hinders free delivery, and may bruise the iris tissue.

Finally, a drop of eserine is instilled into the eye in order, by contraction of the sphincter, to keep the incision in the iris from closing too soon. This remedy can be employed at each dressing of the eye for several days, provided that it is not contra-indicated. *The incision in the iris generally closes completely and without a trace.* Occasionally we see minute alterations at the periphery, which are, however, not at all disturbing.

I have followed this method since the beginning of 1897, and in my last hundred extractions have seen only two prolapses that had to be abscised.

PTERYGIUM AND ITS TREATMENT.

By HENRY LOPEZ, M.D., Havana.

(*With sixteen text-cuts.*)

ACCORDING to statistics compiled by the writer this disease represents 7 per cent. of all the ocular affections; but the proportion must be still greater, for being an indolent disease and of slow progress, those affected with it do not seek advice until the growth has reached an advanced stage, when from its development it presents a striking appearance. We would not be exaggerating in saying that more than half of the male inhabitants of Cuba have pterygium.

Pterygium is, as a rule, a disease observed in adults, being very rarely found before the twentieth year, and more frequently found after thirty. It is rare to find the growth in women, and when found in them it is usually in those living in the country. All races seem to present pterygium in about the same proportion.

Occupation exercises a manifest action in the development of this disease. All those vocations which expose the conjunctiva and cornea to the action of dust or other similar substances, which wound or irritate the eye, are the ones that frequently produce this disease. According to the writer's notes the disease is more frequently seen in laborers, sailors, and cooks. The first mentioned are especially exposed to the irritating influence of dust. In sailors, who are the greater part of the time exposed to the action of the wind, the conjunctiva is in a constant state of hyperæmia, and this consequently produces a condition favorable to the

development of the disease. Cooks, who are compelled to be in smoky rooms, also suffer similar irritation of the ocular mucosa.

Bricklayers and others engaged in similar occupations are likewise exposed or suffer from the disease by the action of the lime or other substances upon the eye.

On the other hand pterygium is seen less frequently in those living in cities than in those living in the country. Again, persons leading sedentary lives are generally exempt from this disease. The poor, who are more exposed to the irritating influences which have been mentioned, are more frequently attacked than the better classes.

Pterygium is essentially a hypertrophy of the bulbar conjunctiva. It commences as a small, yellowish, rounded tumor, having a greater transverse diameter of about two millimetres, and forms a slight elevation over the rest of the conjunctiva. The mechanical action of dust and other similar substances continued for some time maintains a constant hyperæmic state of the conjunctiva. This congestion is limited to a narrow portion in the horizontal meridian of the eye, because the rest of the eyeball is protected from external influences by contraction of the lids. Hence, pterygium is usually found in the horizontal meridian. The internal portion, from the caruncle to the cornea, is more exposed than the external, because the palpebral slit on that side is wider, and consequently more liable to suffer from external influences. After the hyperæmic zone has been established the little tumor before mentioned forms at the point more exposed, *viz.*, right near the cornea. This tumor is described under the name of *pinguecula*, and the classic authors, even some of the modern ones, consider it as an independent disease from pterygium. The writer, on the contrary, is convinced that both these conditions are but different periods of the disease. In fact, it is not rare to observe the evolution of pinguecula into pterygium. The same cause which produced the hyperæmia of the conjunctiva and the pinguecula, also causes an increase in the diameter of the latter, which, not being able to spread toward the cornea, terminates at the limbus by an abrupt border, which is

somewhat more raised than on the opposite side, where it is gradually lost in the healthy conjunctiva.

Having reached this period of development, the pinguecula offers an obstacle to the course of the tears, which are unable to bathe the eyeball as in the normal state, owing to the inequalities of surface which the growth produces. Now, the lodgment of foreign bodies at this point will produce a more or less harmful effect, and will finally cause destruction of the epithelium at the apex of the pinguecula. The adjacent corneal tissue suffers in a like manner, being the part more exposed to contusion, and receives the foreign particles which have been arrested by the pinguecula.

The epithelial desquamation at both points mentioned constitutes the fertile soil for the formation of a pterygium. The movements of the eye will now cause those parts to rub against each other, and in that way the conjunctiva becomes adherent to the cornea. The adhesions which thus take place are firm but superficial, the epithelial coat only being involved. This can be proved by loosening the conjunctiva by gentle traction, and it will then be seen that the cornea remains smooth and without any remnant of conjunctiva.

The adhesion of the conjunctiva to the cornea, which takes place in a very limited space, naturally produces traction of the mucosa in a triangular form, the vertex of which is the point of adherence, and its base is lost without precise limits in the angle of the eye.

All of the deviated mucosa becomes thickened, and assumes a pinkish or red color.

Pterygia make slow but gradual progress until they reach the centre of the cornea, at which point they usually remain stationary. Why they advance and always follow the same direction is as yet undetermined. In recent years some have thought that pterygium is due to the action of some micro-organism, but the truth of this assertion has not been proved. The disease may be classified into two clinical forms: First, true pterygium; second, pterygoid or false pterygium.

The following differential table of both conditions is taken from the writer's recent work on ophthalmology:

Pterygium.	Pterygoid.
1. Is a partial hypertrophy of the bulbar conjunctiva, which adheres to the cornea.	1. Is the adherence of a fold of normal conjunctiva to the cornea.
2. Produced by the traumatic action of dust upon the eye.	2. Consecutive to ulcers of the cornea.
3. Appears in adult life.	3. Occurs at all ages.
4. It is due to desquamation of the epithelium of conjunctiva and cornea.	4. The adhesion necessitates the presence of an ulcer of the cornea.
5. Situated superficially; it does not go beyond the anterior elastic lamina.	5. Situated deeply in the true structure of the cornea.
6. Triangular in form. Its head has a well-marked white border.	6. Triangular or quadrangular in form. Has no white border.
7. Formed in the horizontal diameter, internally or externally.	7. Has an indeterminate direction.
8. Adherent to the bulbar conjunctiva, at least in its axis.	8. It may have a bridge which permits a probe to be passed underneath it.
9. Subepithelial progressive course until it reaches the centre of the cornea.	9. Remains stationary at the point of adherence.
10. The adjacent cornea is transparent.	10. May be surrounded by a zone of infiltration.
11. Can be detached by traction.	11. It is impossible to detach it by traction.

Pterygium, which is the typical form of the disease, has two distinct periods of development: 1st, pinguecula; 2d, pterygium, properly speaking.

We have said before that pinguecula is a small tumor situated in the bulbar conjunctiva near the cornea, and is always found in the horizontal direction. It has a yellowish tint, is opaque, and forms an elevation. Its growth takes place at its horizontal end, which has in consequence a more or less elongated form.

The growth, at first, is generally about one or more millimetres from the cornea, but this distance diminishes slowly as the development increases, until it is in contact with the border. If at this stage the epithelium which covers it, as

well as that of the adjacent cornea, is destroyed by the traumatic action of dust or other substances, both membranes become adherent, and so we have the formation of a pterygium as it is generally understood.

A pinguecula does not provoke disorders of any kind and, as it is not conspicuous, little attention is paid to it. Owing to its indolence as well as to its situation, it is easy to recognize the growth.

The pterygium having become once attached to the cornea, pulls the conjunctiva at the angle of the eye, thus giving the fold a triangular form which looks somewhat like a wing, from which it derives its name.

FIG. 1.—R. E.—Internal Pinguecula in first Stage.

FIG. 2.—R. E.—Initial Stage of Pterygium.

Pterygium progresses from the margin to the centre of the cornea. Why it should extend in a radiating manner and then stop without taking an oblique course or deviating from the horizontal line we do not know; but it is a constant and characteristic fact. In a well-developed pterygium we must consider three portions, a head, neck, and body.

The head is from one to six millimetres in width and follows the vertical line. The transverse diameter has about the same dimension. The head is flat and has the same pinkish color possessed by the rest of the pterygium; but in front, towards the pupil, it is formed by a narrow white band having a diameter from a quarter to half a millimetre, which is formed by a lifting up of the epithelial coat.

Its form is not always rounded, and frequently it is more or less sinuous in shape. At times it assumes a rectangular form.

The neck is not detached from the other parts, except in a very narrow portion, which at times is almost inappreci-

able. This narrow portion is found in proximity to the corneal margin, but always on the side of this membrane.

The body constitutes the largest portion of the pterygium, and extends from the margin of the cornea to the angle of the eye. It has an incompletely triangular form. It forms a marked elevation above the conjunctiva, and is usually reddish, while the normal membrane is colorless and transparent.

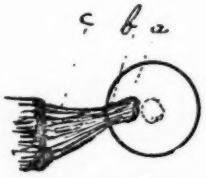

FIG. 3.—R. E.—Pterygium and its Three Portions. *a*, Head; *b*, Neck; *c*, Body. The thickening of the base is the semi-lunar fold deviated.

The superior and inferior borders of the body of the pterygium are rounded, and one can pass, underneath them, a fine instrument up to the axis. Then pterygia are formed by a fold of conjunctiva, which is drawn upon from the corneal side. The fold offers for consideration that the normal conjunctiva covers the sclera, but from the horizontal line it goes above and below to complete the formation of the tumor in a more anterior plane resting just upon the conjunctiva. In order to clear up what we have just stated we append a cut representing a transverse section of a pterygium. It can be thus seen that the fold rests upon the bulbar conjunctiva, and is adherent to the latter by an arrow pedicle, which is the axis of the pterygium.

FIG. 4.—Transverse Section of a Pterygium.

This disposition makes the writer believe that the pinguecula is completely transported upon the cornea, and that the traction occurs particularly upon the horizontal line. The external surface of the fold suffers a like traction, as

may be seen by the deviation of the semi-lunar fold, which is seen transported to midway between the caruncle and the internal border of the cornea. At this period the fold is recognized by the almost straight vertical line which it forms, redder and thicker than the part of the pterygium, at the expense of the bulbar conjunctiva. That part has a rough surface, while the latter is smooth.

The dimensions of a pterygium vary between a pinguecula of 1 *mm* in extent, and a wide band which covers almost half of the eye. As commonly seen, pterygia are usually from 3 *mm* to 5 *mm* in width, and their length extends from the angle of the eye to one half of the radius of the cornea.

Its thickness varies within great limits, from a translucent veil of a slight rosy color up to a thick, very red, fleshy mass. These two aspects have received special names. The first form has been called *membranous* pterygium, and the second has been denominated *vascular*, *fleshy*, or *sarcomatous* pterygium.

In their incipiency pterygia are usually membranous, but later on, owing to their greater development and especially in the cases which suffer from frequent irritation, they become inflamed and they are transformed into the fleshy type, producing thereby a chronic conjunctivitis, which gives rise to considerable discomfort and a moderate amount of secretion. A most distressing symptom of an inflamed pterygium is the persistent lachrymation, due in part to the hypersecretion produced by the inflammatory process, as well as to the difficulty of excretion which the pterygium itself offers, when from its volume it displaces the lachrymal puncta and effaces the lachrymal structures. At times the puncta are almost entirely obliterated, at others the contact of the puncta with the conjunctiva occurs imperfectly, so that the physiological suction of the tears does not take place.

The constant irritation to which the mucosa is subjected produces and maintains the congestive and inflammatory condition which has been mentioned, and as a final result the conjunctiva becomes hypertrophied and sclerosed.

The fleshy form, which at first appears from time to

time when the eye suffers from marked irritation, becomes later on permanent by the hypertrophy undergone by the conjunctival vessels and probably by the new formation of others. These injected and dilated vessels occasion a stain and thus give this form of pterygium its velvety red color, which may be recognized even at a distance.

FIG. 5.—Pterygium of Regular Form.

Pterygia have a triangular form, the vertex of which is fixed on the cornea, and its base is lost in one of the angles of the eye, usually the internal. The form of the pterygium is not perfectly regular, hence its borders are either straight or curved; the axis does not usually start at the centre of the base, and the vertex is rounded or quadrangular.

The regular form has a narrow base, an acute, perfectly horizontal position, which is so disposed that the transverse diameter of the eye divides it into two equal or nearly equal parts.

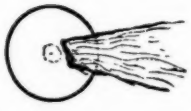

FIG. 6.—Another Regular Pterygium.

The irregular forms are the most frequent. As a rule the triangle tends to assume a rectangular form, the hypothenuse of which will be the inferior border. The superior border in these cases is parallel to the horizontal diameter of the eye and goes slightly above the same, while the inferior border is directed obliquely towards the inferior fornix. When the border of the head is oblique the growth forms a trapezoid.

With respect to the base, it is badly defined in all forms;

it does not exist as a line, but is hidden in the angle of the eye, so that in reality it is angular.

FIG. 7.—Double Trapezoidal Pterygium.

Another form which is not rare is the curved pterygium, the borders of which have the concavity upwards. The vertex is inserted above the transverse diameter of the eye, but terminates with the base slightly below the same. When it is thin it describes a graceful curve. I have observed but rarely the opposite of this form, in which the concavity looks downwards and corresponds to the inferior border of the pterygium, while the superior is convex.

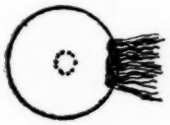

FIG. 8.—Quadrangular Pterygium.

The extremity of the pterygium which is attached to the cornea is not always an acute angle, but may be slightly rounded.

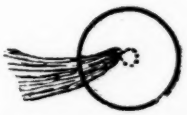

FIG. 9.—Curved Pterygium with Superior Concavity.

The growth frequently widens, reaching a diameter of 2 *mm* to 5 *mm*, and forms a more or less straight line at its point of insertion in the cornea, and as the inferior border is generally oblique, it gives the pterygium a trapezoidal shape.

Pterygia as well as pingueculæ may remain stationary for many years or indefinitely. In the island of Cuba, where I made my observations, the great majority of male adults suffer from pinguecula, and many women also present the first stage of the growth.

From the time a pterygium becomes attached to the cornea its course assumes more rapidity, although the new formation is characterized by its slowness of growth. For the head of the tumor to cover the radius of the cornea years are required. In the majority of cases the growth remains stationary before reaching the centre of the cornea, or if it advances it does so in an almost inappreciable manner.

FIG. 10.—Curved Pterygium with Inferior Concavity.

The vision becomes more or less affected, due to the traction and deformity which the tumor produces upon the cornea. In extreme cases in which the head invades the pupillary field the sight suffers considerable diminution. When the growth has reached an extreme development, even if it is extirpated, the opacity which persists at the point of insertion will produce more or less damage so that normal vision is not regained. Hence all pterygia should be removed before they have invaded one quarter of the diameter of the cornea.

Now the vertex of the tumor is at times as wide as the base, from which results a quadrangular form which is extremely rare. I have seen it once in a child, which makes me believe that it was rather a pterygoid.

Being aware that this form of pterygium occurs so rarely, the writer herewith presents the case alluded to:

The patient was a white child, twelve years of age; rachitic. In O. D. there was an unusually large attachment of the bulbar conjunctiva to the cornea, limited by a vertical line, and comprising more than the external half of the membrane. It raised the inferior fornix towards the external angle of the eye. In O. S.

there were two delicate conjunctival folds attached to the cornea, both internally and externally, and involving nearly all the vertical diameter of the cornea. There was only a narrow band of

FIG. 11.—Quadrangular Congenital Pterygoid.

the cornea which was perfectly transparent, which was closed above, where the two pterygia became united. The posterior part of the internal pterygium presented a dark appearance.

Behind these folds in both eyes a probe could be passed.

The child's father stated that the condition of the right eye was observed at birth, and in the left the anomaly made its appearance before the child was one year of age.

FIG. 12.—Double Quadrangular Pterygoids.

For the sake of comparison the writer has appended two cuts representing typical forms of pterygoid. One, as will be seen, is superior, produced by blenorrhœal conjunctivitis, which determined considerable corneal ulceration to which the conjunctiva attached itself superiorly. The traction of the mucosa has displaced the fornix downwards, and it nearly reaches the upper border of the cornea. The fornix is seen

FIG. 13.—Superior Pterygoid.

as a thickened, rugous, very red mass, while the luxated bulbar conjunctiva is translucent, permitting the configuration of the cornea to be made out.

The second example represents a well-developed inferior pterygoid occurring in a leprous subject who had ectropium of the lower lid, and consequently the inferior half of the eyeball was not protected, and besides there was anæsthesia of the mucosa, circumstances favoring the production of a corneal ulcer, which in turn gave rise to the formation of a pterygoid.

FIG. 14.—Double Pterygoid.

It remains to speak of the **treatment of the affection** which we have considered.

Astringents and caustics have been used in the treatment of pterygia, but as the writer is convinced of their inefficiency he will only mention the fact and pass on to consider the surgical procedures which have received the most attention.

Benjamin Bell recommended in 1813 the practice of scarification of the body of the pterygium perpendicularly to its axis and at the level of the corneal margin. By this means he claimed to have obtained favorable results in the membranous variety of the growth; but to meet the well-developed fleshy forms he employed, he says, "enucleation, because of the danger of the growth degenerating into cancer."

The extirpation of pterygia, after transfixing the neck with a thread which serves to facilitate its detachment and then cutting its insertion close to the cornea on one side and on the other near the angle of the eyes, has been practised for many years. Weller, in 1832, and Walton, in 1853, used to practise this method. Mackenzie lifted the growth at its centre with a strong pair of forceps and excised with one cut of the scissors and terminated by trimming the ends. Deval used the same method, but would pass a thread through the centre of the pterygium, because by so doing

he could exert a more energetic traction than with the forceps.

Scarpa, at the beginning of this century, operated with originality. He made traction upon the head by means of forceps until its detachment was accomplished; then the pterygium was loosened by dissection in the direction of its base, and he finished by removing this concentrically to the cornea, 3 *mm* to 4 *mm* from the margin. He did not use sutures.

Lawrence, in 1830, and Wharton Jones, in 1863, operated in the same way as Scarpa. So did Abadie in 1876, and also Fano, who would finish the operation by applying sutures in the bulbar conjunctiva.

Desmarres, in 1855, when he operated would detach the pterygium from the cornea, and stitch its head into a triangular wound made in the adjacent lower fornix of the conjunctiva of the ball. Knapp has recommended a modification of this method, viz., in large pterygia he split the mass along its axis and transplanted one half into the upper fornix, the other into the lower.

Szokalski, in 1842, would pass three sutures through the axis of the pterygium in order to strangulate it, and on the third day would extirpate the growth.

Pagenstecher covered the point of corneal insertion with the ocular conjunctiva, the latter having previously been dissected, while the pterygium after being detached up to its base was left alone to become atrophied.

Wecker inserts conjunctival sutures, and also leaves the pterygium adherent at its base. If on the following days the growth becomes inflamed and produces discomfort he extirpates it with scissors.

Galezowski followed an analogous procedure in 1880, but, instead of leaving the pterygium, he doubled it up at the base by means of a double thread which transfixed the vertex and the extremities of the base, after which it was firmly tied.

Panas at the present time uses the method of extirpation, and cauterizes with the actual cautery the point of corneal attachment, and sutures the bulbar conjunctiva.

According to Fuchs, Arlt was the first to employ sutures after extirpating the pterygium. Fuchs operates according to the old method of detaching the head of the growth and extirpating a rhomboidal flap, making an incision at an acute angle from the side of the base, and then applies sutures.

From the summary which has just been given it can be seen that the surgical treatment of pterygium has been based upon the following general procedures:

1. Scarification.
2. Deflection.
3. Strangulation.
4. Extirpation.

The majority of surgeons believe that scarification is not sufficient to obtain a cure; on the other hand this procedure has only been employed in the membranous forms.

The method of deflection or transplantation as proposed by Desmarres is so complicated that it has had but few adherents and to-day it is not used.

Strangulation is also objectionable, because it is a tedious process.

From the many times I performed Galezowski's operation at the beginning of my professional career I became convinced of the drawbacks which it has, for the massing of the pterygium at the internal angle of the eye produces discomfort, intense conjunctivitis, and distressing lachrymation; and in a great number of cases I have been compelled to proceed to extirpation in order to remove the distressing symptoms.

The method of extirpation is the most rational one, the easiest to perform, and consequently it is the one employed by the majority of operators.

The writer has used this method of operation for years, and by it has obtained better results than by any other.

The method as practised by the author is performed as follows: After obtaining anæsthesia by means of cocaine instillation, and introducing the speculum, the head of the pterygium is picked up with a strong pair of forceps and detached by traction; the lateral attachments are now severed by two or three clips with the scissors, and then the growth

is extirpated near the base. An important point is to dissect that portion of the conjunctiva near the corneal margin above and below, so as to avoid having these parts become reattached to the cornea.

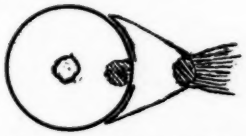

FIG. 15.—Showing the Incision and Dissection of Conjunctiva Up and Down, after Excision of the Pterygium.

As a rule, I do not insert any conjunctival sutures, because, besides offering no advantage, they produce a disagreeable scar, and the mucosa remains more or less hyperæmic.

I do not believe it wise to cauterize the point of corneal attachment with the solid stick of nitrate of silver, because it is painful and produces considerable reaction and ulceration of the cornea without preventing the return of the growth. Indeed, the effect produced by cauterization may favor reproduction, because reproduction is, I think, due to the persistent destruction of the corneal epithelium. Hence we should endeavor to keep the conjunctiva away from the cornea until its epithelium has regenerated.

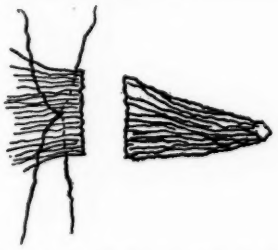

FIG. 16.—Sutures Passed through the Base of a Voluminous Pterygium.

After extirpating large pterygia it is my custom to pass a double thread through the base, thus inserting two sutures, one above and the other below, so that the stump is strangulated.

This simple and rapid procedure gives excellent results, as I have been able to prove after comparing it with other methods.

OPERATIVE TREATMENT OF LESIONS OF THE FRONTAL SINUS.

By Dr. S. S. GOLOVINE,

PRIVATDOCENT OF OPHTHALMOLOGY IN THE IMPERIAL UNIVERSITY OF MOSCOW.

Translated from the French original MS. by Crosby C. Whitman, M.D., New York.

(*With three illustrations.*)

I.

A few general remarks concerning the treatment of the sinus.

The different lesions of the frontal sinus offer special interest to surgeons, oculists, and rhinologists. Notwithstanding the united efforts of these specialists, this branch of medicine cannot as yet be considered perfectly understood, especially as far as its diagnosis and therapeutics are concerned. At present the different methods of examining the sinus are not perfectly understood, and do not permit a recognition of a lesion of this region in its initial stage. In the long run, however, any lesion of the sinus, whether deep-seated or local, affects, to a certain degree, other organs; as in certain cases in literature where the eye, nasal fossæ, and even the entire body are affected. The most important complication, however, is that of the cranial cavity. Professor Kuhnt[1] cites seventeen cases, in which this latter complication has proved fatal, and he says undoubtedly there are many others, and this seems to be true; for example, the

[1] Prof. H. Kuhnt, *Ueber die entzündlichen Erkrankungen der Stirnhöhlen und ihre Folgezustände*, Wiesbaden, 1895, S. 2.

cases of Richardson Cross,[1] Wiedemann,[2] Krecke,[3] Müller,[4] Treitel.[5]

We see by this, therefore, in any lesion of the frontal sinus how important it is to begin treatment as soon as possible, and undoubtedly the specialists already mentioned are all very anxious to know a certain and rational treatment, but in this lies the difficulty.

Without going into details and setting aside all non-operative methods (for instance, the probing of the sinus proposed by Dr. Jurasz), I shall only mention the principal ideas which enter into this question.

When an operative treatment is considered necessary it ought to embrace two conditions:

1st. That a complete cure be obtained.

2d. That the patient should not be disfigured by the operation.

It is possible to enter the frontal sinus in two ways, *i. e.*, by the nose, and by cutting the external walls of the sinus.

The first of these methods is now considered dangerous (Dieffenbach, Schaeffer). Many tragic cases are cited in literature, where the surgeon, instead of entering the sinus, perforated the cribriform plate.[6] It is much easier and surer to enter the sinus by trephining the exterior walls. There are, however, many modifications of this operation, which differ according to the incision made, the trephine opening, and the method of draining (Richter, Ogston, Grünwald, Panas,[7] Luc,[8] and others).

As soon as the sinus has been opened, surgeons, as a rule, have continued the operation in two ways. On the one hand, a purely conservative treatment has been tried, in the

[1] R. Cross, "Three Cases of Empyema of the Frontal Sinus," *Ophthalm. Review*, 1892, p. 221.

[2] Wiedemann, "Das Empyem der Stirnhöhlen," *Dissert.*, Berlin, 1893.

[3] Krecke, *München med. Wochensch.*, 1894, 51.

[4] Müller, "Ueber Empyem des Sinus frontalis, und ethmoidalis," *Wien. klin. Wochen.*, 1895, N. 11–13.

[5] Treitel, "Ueber Hirnabcesse nach Stirnhöhleneiterung," *Deutsch. med. Wochensch.*, 1896, N. 47.

[6] Kuhnt (*l. c.*), p. 193; L. Grünwald, *Die Lehre von den Naseneiterungen*, 2te Aufl., München, 1896, p. 132.

[7] Prof. Panas, *Archives d'ophtalmologie*, x.; *Traité des maladies des yeux*, t. xi., p. 472.

[8] Luc's method is described by Salvador Ortega, "Contribution à l'étude de l'empyème des sinus frontaux," *Thèse de Paris*, 1895, p. 53.

hope of re-establishing the normal condition of the mucous membrane, and the free communication between the sinus and the nasal fossæ. But lesions of all mucous membranes have a tendency to relapse, especially those of the frontal sinus, on account of its anatomical construction; thus these operators have often observed a return of the initial lesion, and are obliged to operate again (as, for example, in the case of Prof. Sklifossovsky,[1] four relapses in two years). On account of such results, other operators decided to completely destroy the mucous membrane, in the hope of obliterating the sinus (Runge-Nebinger,[2] Luc). But literature proves to us that this last method, while deforming the face, does not always completely cure. This failure to cure depends on the fact that it is very difficult to *curette* all parts of the sinus, and thus surgeons may involuntarily overlook some part of the mucous membrane which may suppurate later. In cases of this kind the operation has to be repeated several times (Dr. Luc[3]). If it is not repeated, fistulas are liable to form and are very slow in healing.

F. Steiner[4] said even in 1871 that "Wunden der Stirnhöhlen wurden noch bis in die neuere Zeit von manchen Chirurgen für bedenklich gehalten," and Spencer Watson[5] cites a case of a frontal-sinus fistula not yet healed after a lapse of one and a half years. Peyrot[6] cites another case, where a fistula was not healed until the end of two and a half years after the operation. Guillemain[7] says that in nearly half the cases a permanent fistula was the result. He explains this by the fact that the walls of the suppurating cavity, being so rigid, have no tendency to heal. From this it is plainly seen that trephining, especially conservative trephining,

[1] *Compte rendu de la clinique chirurgicale du Prof. Sklifossovsky, Années 1884–1890*, Moscow, 1891, p. 24 (Russian).

[2] Dr. NEBINGER's method is described by M. PRAUN, "Die Stirnhöhleneiterung und deren operative Behandlung," *Inaug. Dissert.*, Erlangen, 1890.

[3] ORTEGA (*l. c.*), Observations I., IV.

[4] F. STEINER, "Ueber die Entwickelung der Stirnhöhlen, und deren krankhafte Erweiterung durch Ansammlung von Flüssigkeiten," *Arch. für. klin. Chirurgie*, Bd. xiii., Heft 1, 5, 205.

[5] KUHNT (*l. c.*), p. 195.

[6] ORTEGA (*l. c.*), Observation XXIII.

[7] A. GUILLEMAIN, "Étude sur les abcès des sinus frontaux, considérés principalement dans leur complications orbitaires," etc., *Archives d'ophtalmologie*, t. xi., 1891, p. 120.

offers very doubtful chances of recovery. On this account, more complicated but surer methods must be resorted to. Of three methods proposed, one belongs to Dr. Jansen, another to Prof. Kuhnt, and a third to Prof. Czerny.

Dr. Jansen [1] proposes to take away all the orbital wall of the sinus by making, first, an incision under the lower edge of the eyebrow. After taking away this lower wall with a chisel, the mucous membrane is next removed and the sinus tamponed. On account of this open treatment, the sinus begins to fill with granulations and epithelium forms (Epidermisirung der Höhle). Dr. Jansen insists that the incision made along the lower edge of the eyebrow is scarcely visible, but Grünwald,[2] to whom Jansen showed a similar case, is not of the same opinion.

Prof. Kuhnt [3] proposed to take away the entire anterior wall of the frontal sinus. Other operators have also used the same method, in cases where the anterior wall of the sinus was badly diseased (Steinthal,[4] Luc,[5] Kalt,[6] Grünwald [7]). The first operation of this kind performed by Kuhnt was a very serious one, where he was obliged to take away the entire anterior wall. He *generalized* this method and highly recommended it in his fine work, "Principielle Wegnahme der ganzen vorderen Sinuswand und der gesammten kranken Schleimhaut." According to his statement the cure is complete in six weeks at the most, and with no facial deformity. This method, as performed by H. Kuhnt, is indeed a very important acquisition to surgery, inasmuch as it assures a complete recovery; and as regards any disfigurement, he says in six cases out of nine on which he operated, there was scarcely any trace of a scar (NN. III., VII., VIII., IX., X., and XI.).

As the opinion of the æsthetic side of the operation

[1] JANSEN, "Zur Eröffnung der Nebenhöhlen der Nase bei chronischer Eiterung," *Archiv f. Laryngologie*, Bd. i., 4; ii.
[2] GRÜNWALD, *Die Lehre von den Naseneiterungen*, 2te Aufl., p. 264.
[3] KUHNT (*l. c.*), p. 203.
[4] STEINTHAL, "Zur Behandlung der Stirnhöhlen-Empyeme," *Würtemb. med. Korrespond.-Blatt.*, 1891, N. 31 (*Michel's Jahresbericht*, Bd. xxii., S. 419).
[5] ORTEGA (*l. c.*), Observation I., p. 60.
[6] PANAS, *Traité des maladies des yeux*, t. ii., 1894, p. 475.
[7] GRÜNWALD, *Münch. med. Woch.*, 1895, 20.

is entirely subjective we think it best to quote the following remarks:

Fall N. IX., S. 239: "Die Einziehung auf der Stirne war anfangs eine wesentlich bedeutendere als bei den übrigen Kranken . . . , verkleinerte sich aber in den folgenden Monaten nicht unbeträchtlich."

Fall N. X., S. 242: "Die ganze Gegend des Sinus ist merklich eingesunken, in folge der frühzeitigen Verwachsung des horizontalen Schnittes (der diesmal zu hoch, d. h. etwa 1 *cm* über dem Margo orbitalis angelegt wurde) mit der hinteren Sinuswand."

Fall N. XII., S. 247: "Erst nach etwa vier Monaten war die Heilung eine definitive. Mässige Delle über dem oberen Orbitalrande."

In conclusion, then, in cases where the anterior wall of the sinus is seriously diseased, and especially where there are cerebral symptoms, the operation as performed by Prof. Kuhnt is preferable; on the other hand, in less severe cases, it is more advisable to keep intact the anterior wall, which offers at the same time excellent plastic material.

It follows, then, that, while recognizing the merit of Kuhnt's operation, we ought to find other means that would offer to surgeons more liberty in choice of remedies, according to the operation to be performed.

It would indeed be strange if, at times, osteoplasty had not been resorted to, as it has so often proved of service to surgeons; and, in fact, Prof. Czerny has written an article of this kind for the XXIV. Congress der deutschen Gesellschaft für Chirurgie, April 20, 1895. He performed only one operation, in the following manner[1]:

"Bogenförmiger Schnitt über die Glabella nach unten convex, unkreist einen Hautperiostlappen dessen Basis in der Mitte der Stirne liegt. Nach Führung des Schnittes bis auf den Knochen wird derselbe in der Höhe der rechten Stirnhöhle mit den Meissel durchtrennt, und die vordere Wand der Stirnhöhle mit den Hautperiostlappen im Zusammenhang nach aufwärts geklappt."

Dr. N. Volkovitch used almost this same method on a

[1] Prof. V. Czerny, *Archiv für Klinische Chirurgie*, Bd. 50, Heft 3, 1895, S. 544.

patient, whom he showed at the 6th Congress of Russian Physicians at Kyeff (April 25, 1896).

To conclude, I am now going to present my own observations taken from twelve cases operated on by me at the ophthalmological clinic in the Imperial University at Moscow.

In 1895, I had to treat three cases of lesions of the frontal sinus, and not knowing then the methods of Kuhnt and Czerny, I performed the ordinary trephining.

The following are these cases[1]:

CASE 1.—*Fistula and ectropion of the upper right eyelid; erroneous diagnosis of caries of the orbit. Empyema of the right frontal sinus.*

E. E., peasant, forty-five years old (*historia morbi*, N. 502), came to the clinic of ophthalmology in the following conditions: Complete ectropion of the upper right eyelid; under the superior orbital ridge, at about the junction of the middle and external third, there was a fistulous opening; a probe could penetrate only to the depth of 1½ *cm* and hit against a mass of soft tissue. Macula of the cornea. The movements of the eye normal. This trouble, which began two years before, was the result of a cold, the patient complaining of a pain along the upper orbital ridge. In a short time, there came a slight swelling, which finally burst, leaving a fistula. Owing to the supposed necrosis of the bone following periostitis, an incision was made, along the upper orbital ridge, the 20th of March, 1895, under chloroform. The upper orbital wall was found denuded for a considerable space, and presented small inequalities which were removed with the curette and chisel. Not finding any sequestrum, I supposed the operation finished, when after a more careful examination I found a small opening, situated at the external third of the orbital arch, which could be probed downward and inward. By means of the chisel, I enlarged this opening, and the probe then entered the frontal sinus. This I then opened and packed with iodoform gauze. Two weeks later, I placed in this opening a silver tube, made especially for this case. April 19, 1895, the patient left the clinic and went to the country. The final result of this operation is not known.

[1] All my observations in this article are abridged. In the work in Russian they will be reported *in extenso*.

In order to demonstrate the pulsation of the contents of the frontal sinus, I arranged a simple water manometer, which was adapted to the silver tube. By this means I obtained synchronous oscillations with the arterial pulsations.[1]

This case presents two points of interest:

1. *The peculiar direction of the pus contained in the sinus.*

2. *The possible errors of diagnosis and of operative treatment.* This case is somewhat similar to that mentioned by Prof. Panas in his *Traité*.[2]

CASE 2.—*Empyema of the left frontal sinus. Fistula and ectropion of the left upper eyelid. Total leucoma of the cornea.*

J. K., aged thirty-six, entered December 6, 1895 (*historia morbi*, N. 652). The disease began two years ago, with a swelling of the upper eyelid and forehead, which developed into an abscess and the formation of a fistula, which led into the sinus. The ectropion of the eyelid and the affection of the cornea appeared at the same time.

December 15, 1895, the patient was put under chloroform and operated upon. Incision was made, in form of an angle, near the inner extremity of the eyebrow; loosening of the teguments and periosteum; perforation of the bone, by means of a gouge and mallet, directly above the root of the nose. Careful curettement of the mucous membrane.

As the ordinary drainage offered many difficulties, a Bowman No. 6 silver sound was substituted. One of the ends of this was a little twisted, and projected out of the trephine opening; the other end was in the nasal cavity. The wound was then sutured and perfect cicatrization followed.

January 23, 1896, blepharoplasty according to Fricke's method was performed, under chloroform. The silver tube was taken out March 17, 1896. The 23d of March, 1896, the patient left the clinic completely cured.

CASE 3.—*Empyema of the left frontal sinus. Abscess of the left upper eyelid.*

B. P., seventy-one years old, entered December 3, 1895 (*historia morbi*, N. 659). Œdema of the skin of the forehead; phlegmonous aspect of the upper left eyelid, with deep fluctuation;

[1] The patient and the apparatus were shown at the meeting, April 11, 1895, of the Cercle Ophtalmologique de Moscou.

[2] Prof. PANAS, *Traité*, i., ii., p. 471.

slightly developed exophthalmos; movements of the eye normal, background of the eye also normal. The patient for a long time past had suffered from a chronic coryza. The actual acute condition had only existed for the past ten days.

The 3d of December, 1895, an incision was made underneath the eyebrow to let out the pus. On probing the bone was found bare, and the frontal sinus could easily be entered. The 12th of December, 1895, an operation, under chloroform, was made. Incision of the skin and trephining, as in preceding case; curettement of the mucous membrane; drainage by means of a rubber catheter placed in the nose; suture of the wound, and perfect healing without complications.

The patient left the clinic December 26, 1895. January 22, 1896, the drain showed no secretion, and was taken out of the nose. In two weeks there was a relapse, and I had to operate again, but by another method this time.

The impression I had of these operations was far from satisfactory. One is never sure of a complete curettement in operating through a trephine opening, and, in fact, as is shown in one of these three cases where the curettement was considered complete, there was a relapse. It was this that forced me to seek another and surer method. Little by little, therefore, I finally devised two different methods.

For the first I decided to find some caustic which, introduced into the frontal sinus, would cauterize every part of it, and for this I chose steam. For the second, on the contrary, I decided to make the opening large enough to examine all parts of the cavity with ease, but the difficulty here arose of perfectly closing this opening. Without knowing the method performed by Czerny, *I decided to make an osteo-plastic opening*. Later, however, experience proved to me that my method had some advantages over that of Czerny. But I easily concede that the following method is nothing more than a confirmation and development of the idea conceived by Czerny.

II.

Osteo-plastic opening of the frontal sinus.

After many experiments on the cadaver, I finally adopted the following osteo-plastic procedure: A cutaneous incision about 4*cm* long is made along the upper edge of the internal

half of the eyebrow, and at its internal extremity another incision is made obliquely to it, following the fold of the corrugator muscle of the eyebrow. These two incisions form the letter T placed horizontally (Fig. 1), and in depth they reach to the periosteum. The soft tissues, forming the upper border of the incision, can be detached and lifted up. An arched incision of about 2 *cm* in height is then made through the periosteum, the base of which corresponds to the internal third of the upper orbital ridge.

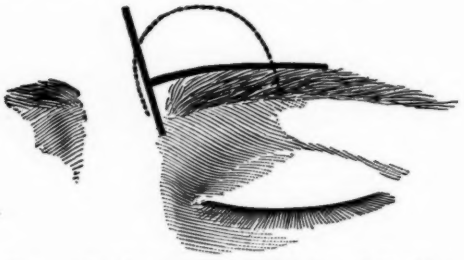

FIG. 1.—Angular, ⊢shaped incision through the skin; arched incision through the periosteum.

The dimensions of the arch ought to conform to the proportions of the proposed opening. Then following the line of incision, made in the periosteum, a small groove is hollowed out with a chisel, which does not penetrate farther than the diploë. Then, by means of a thin, flat, and very wide chisel, held obliquely, the bone is cut out without danger of entering the skull.

This little piece of bone, formed from the anterior wall of the sinus, can be raised and turned back like a small shutter, the periosteum and soft tissues serving for hinges at its base. The result of this is an opening sufficiently large to admit of complete examination, and enabling one to perform a thorough curettement.

A drain is passed through the nose, the small bony shutter is put back in its primitive place, the wound is sutured and dressed.

My method differs from that of Prof. Czerny in the following respects: 1. A more simple incision of the skin than

that of Czerny and Volkovitch. The cicatrix, which is very fine, is hidden in the eyebrow, and thus in no way spoils the patient's looks. This method enables one to use easily, if necessary, from the very beginning of the operation, Prof. Kuhnt's manner of removing the anterior wall of the sinus. 2. Czerny uses a *cutaneous osteo-periosteal* flap, while mine is only osteo-periosteal, so that the incision of the soft tissues and that of the bone do not *coincide*. In this way is avoided the formation of a deep scar. 3. With Czerny and Volkovitch, the base of the bony flap reaches to the middle of the forehead, while mine rests on the upper orbital ridge. This difference does away with all danger of perforating the skull.

In the three following cases I have used my method.

CASE 4.—*Empyema of the right frontal sinus. Fistula of the upper eyelid.*

A. Ch., aged fifty, entered the clinic October 14, 1896 (*historia morbi*, N. 337). Fistula under the middle of the eyebrow leading to the sinus, position and movements of the eye, fundus, and visual field, normal. Right eye V = 1.0. The fistula was the result of an acute abscess of the upper eyelid appearing in May, 1896. Chronic coryza.

October 23, 1896, osteo-plastic opening of the sinus, under chloroform. The cavity of the sinus was thoroughly examined and a complete curettement of it was made. Drainage through the nose, by means of a rubber catheter. The small piece of bone was put back in its place and the entire incision sutured; rapid recovery per primam; no post-operative complication. The patient left the clinic in seven weeks, although he could have done so sooner. The drain was removed January 10, 1897, that is to say, 2½ months after the operation; subsequent dressings in the dispensary. The cicatrix was very slight and hardly visible, not the least depression over the wound, no facial deformity. This patient was shown December 2, 1896, at the meeting of the Cercle Ophtalmologique de Moscou, and August 11, 1897, at the Section of Ophthalmology of the International Medical Congress at Moscow.

CASE 5.—*Abscess of the upper left eyelid. Empyema of the left frontal sinus.*

M. V., thirteen years old, entered the clinic October 23, 1896 (*his-*

toria morbi, N. 251). Several days before this, the patient came to the out-patient department, suffering from an abscess of the upper left eyelid. An incision was made and on further examination an orifice was found in the orbital arch near its upper ridge. The eye projected forward and was slightly turned downward; the fundus was normal; the sight diminished, V = 0.5. The visual field normal.

The patient was chloroformed and an osteo-plastic opening made November 12, 1896. There was an abundant flow of pus. The horizontal dimension of the sinus 3 *cm*; vertical 2 *cm*. Complete curettement of the entire cavity. A rubber tube was used as a drain, leading out and in front of the internal extremity of the eyebrow. The small bone was perfectly fitted to the opening; suture of the incision; healing per primam. The drain was removed two months after the operation; rapid cicatrization. The small depression made by the drain was cut out, January 29, 1897. No facial deformity, cicatrix scarcely visible. August 19, 1897, a letter was received from the patient's brother, which said that, up to that date, there had been no relapse whatsoever—and the scar was hardly visible. This patient was shown at the meeting of the Society of Ophthalmology at Moscow, December 2, 1896.

Case 6.—*Right frontal sinuitis. Mucous polypi.*

The patient, a woman, O. G., twenty-seven years old, entered the clinic January 23, 1897 (*historia morbi*, N. 937). All functions of the eye normal. On the forehead, near the internal extremity of the right eyebrow, was a small swelling of the skin, which appeared and disappeared intermittingly and rapidly. Digital pressure on the outer and lower walls of the sinus caused slight pain. Examination by trans-illumination negative. Headache.

Ever since July, 1896, there had been a persistent flow of pus, from the right nasal opening. This had resisted all treatment given by Dr. E. N. Malintine, who was kind enough afterwards to give the patient into my care. The patient was chloroformed and an exploratory opening was made February 5, 1897, according to the osteo-plastic method. The sinus was large, measured horizontally 4 *cm*; vertically 3.5 *cm*. The entire mucous membrane was covered with polypi. There was a profuse muco-purulent secretion. A thorough curettement was made; drainage through the nose. The small bone was perfectly fitted to its place; suture of the incision; healing per primam. The patient left the clinic seven weeks after the operation, with but little facial deformity.

This patient was shown before the Section of Ophthalmology at the International Medical Congress of Moscow.

I wish to add to these three cases a fourth not at all similar, as an exploratory opening showed an absence of the frontal sinus. This case is instructive in this respect, that an opening of the cranial cavity is less to be feared when using the osteo-plastic method, which accident has happened in similar cases to several operators (Sapechko,[1] Kuhnt[2]).

CASE 7.—*Exophthalmos of left eye.*

Patient, a boy, ten years old, E. Sp., entered the clinic January 16, 1897 (*historia morbi*, N. 954). On the left upper eyelid was a swelling, which extended along the forehead above the inner extremity of the eyebrow. Redness of the skin of the upper eyelid. The inner part of the orbital arch was very painful on digital pressure. The eye protruded very much, with deviation downwards and outwards. Interior and vision normal. No positive results obtained from electric-light examination. Examination of the nose made by Dr. E. N. Malintine showed a slight swelling of the middle turbinals and a slight hyperæmia of the mucosa. Severe headache, arythmia of the pulse. The trouble followed an attack of "la grippe" a month and a half before. The preliminary treatment did no good whatever, so a consultation was held between Prof. Krükow, Spigearny, and myself, and it was decided to perform an exploratory opening of the left frontal sinus. There were many symptoms pointing to a lesion of the sinus, although, considering the age of the patient, we could not depend on finding the sinus completely developed.

The patient was chlòroformed and operated upon February 26, 1897. After raising the small piece of bone, the sinus was found to be wanting. The diploë was then, little by little, taken away, until the posterior wall of the frontal bone was reached. The cranial cavity was not opened. The small piece of bone was put back in its place and the incision sutured. The patient was discharged March 13, 1897. The exophthalmos, although diminished, was not completely cured. There was no depression over the wound. The facial deformity was satisfactory, although the incision showed much more than in the preceding cases, on account of its being accidentally made too high above the eyebrow.

[1] SAPECHKO, "Sur les affections des sinus frontaux," *Westnik Ophtalmolog.*, 1889, No. 6, p. 434 (Russian).
[2] KUHNT (*l. c.*), Fall N. 13, T. 250.

From these cases I can testify that the operation according to the osteo-plastic method is quite easy. It is true that the cutting out of the small bony flap is somewhat difficult and takes more time, but this may be lessened by using the more recent craniotomy methods. For this purpose I can recommend Dalgren's instrument or some mechanical saw.[1] I have used exclusively pieces of rubber catheters for the drainage through the nose. At the end of two weeks this drain can be taken out, cleansed, and put back. This drain can also project from the wound underneath the inner edge of the bony flap, as described in Case 5.

The post-operative treatment consists in the daily lavage of the wound, through the drain, with peroxide of hydrogen, which I highly recommend. There is, as a rule, no complication during convalescence. The patient can always leave the clinic at the end of a month. When I have kept mine longer, I have done so in order to follow better the convalescence. In fact, at the end of a month such a small quantity of pus comes from the drainage tube that the patient is perfectly able to return to his occupation and to be treated in a dispensary. I do not agree with the operators who remove the drainage tube too soon, for example Dr. Luc, who removes it at the end of three weeks. I keep it in place two months at least. What are the results obtained by this method? It insures a complete cure, as the opening is large enough to completely curette the cavity of the sinus. As far as facial deformity is concerned, we have obtained perfect results. No depression, and scars scarcely visible. With such results, I claim that to-day it is much easier to operate in all obstinate cases, and also easier to make an exploratory opening in all suspected cases.

III.

Application of steam in cases of frontal sinus disease.

In ancient practice, all wounds were treated with either boiling water or boiling oil. This treatment has been abandoned.

[1] At the ophthalmologic clinic in Moscow we have begun to employ a "resection drill," moved by an electric motor.

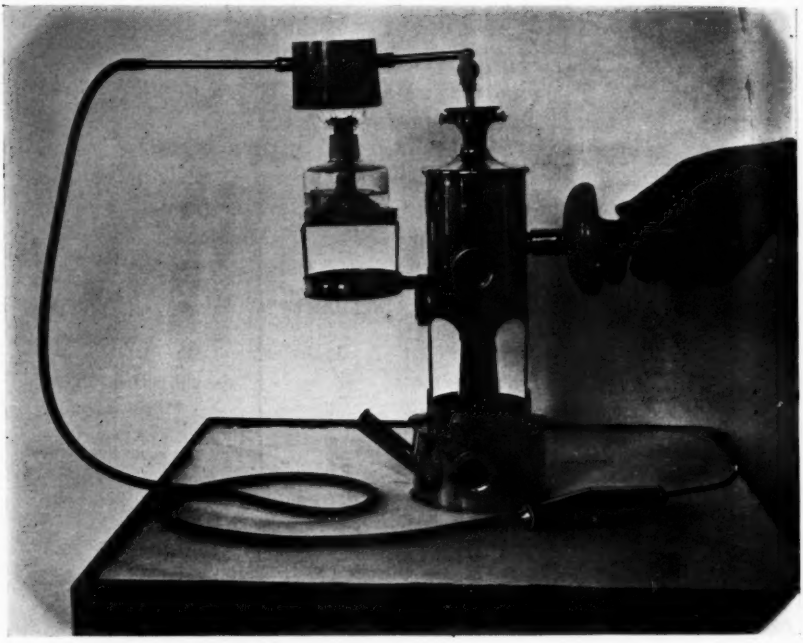

FIG. 2.—Steam-Producing Apparatus to Destroy the Mucous Membrane of the Sinus.

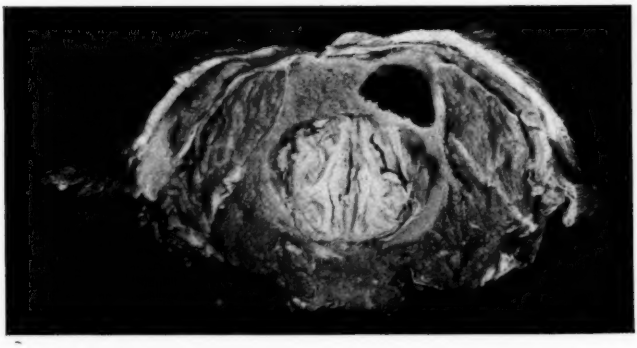

FIG. 3.—Section of the Head of a Dog, a Year after the Operation. The sinus operated on is completely filled with bone tissue, resembling slightly hardened diploë, whereas the other sinus, not operated on, is normal.

To illustrate Dr. S. S. Golovine's paper on 'Operative Treatment of Lesions of the Frontal Sinus."

Recently, however, Jeannel (who calls it *ébouillantement*), Trendelenburg, Phocas, and others recommend it again.

Prof. V. Snieguireff, professor of gynecology, of the University of Moscow, has used steam since 1896 during his operations instead of boiling water. The favorable results obtained by him decided me to use this mode of treatment in my operation of the frontal sinus, and I shall hope by this method to completely obliterate the sinus, for steam, on account of its expansibility, can penetrate to the most remote corners of the sinus and thus entirely destroy the mucous membrane. A very small trephine opening is all that is necessary to introduce the steam into the sinus, otherwise too large a scar might remain. To make steam for this purpose, I use an apparatus devised by Prof. Snieguireff, Text plate IV, Fig. 2. It consists of a small portable boiler under which is an alcohol lamp; to the top of this boiler is attached a short metallic tube, bent at right angles and provided with a small cylinder, under which is placed a second alcohol lamp. To this tube is attached a long rubber tube, having at its farther extremity a handle and distributing nozzle. The steam on leaving the small boiler falls to 60 or 65 degrees, but rises again on reaching the cylinder, and remains at about 100 degrees.

Thanks to the kindness of Prof. Tocht, I could try this method first on dogs, in his laboratory of general pathology. On these dogs I made an opening in the frontal sinus with a chisel, into which I let the steam flow from one to two minutes. The cicatrization was per suppurationem. The final results will be shown later. As soon as these experiments proved satisfactory to me, I decided to use the same method on patients suffering with lesions of the frontal sinus, in the three following cases.

CASE 8.—*Empyema of the left frontal sinus. Fistula of the eyelid.*

The patient, M. Tch., fifty-three years of age, entered the clinic February 15, 1896 (*historia morbi*, N. 720). There was an opening of a fistula in the upper eyelid, under the middle of the eyebrow. A probe entered easily, and gave evidence of a large sinus. The position of the eyelid normal. The position of the eye, its

movements, fundus, and visual field normal. The trouble began by a small swelling on the forehead and eyelid, which came intermittingly, during the summer of 1895. Finally in September, 1895, there was an abscess of the upper eyelid, which resulted in a fistula. February 21st, the patient was operated upon, under chloroform. An angular incision was made in front of the inner extremity of the eyebrow and the tissues and periosteum raised. Above the root of the nose a round hole, 1 *cm* in diameter, was made, out of which came quite a quantity of greenish pus. The sinus was found to be large and cubic in form. Vertical dimensions 4 to 5 *cm*. Steam was injected into the sinus through the opening twice; each injection lasting ½ of a minute. A drain was then put in the opening and the rest of the wound was sewed. The post-operative treatment consisted in washing the wound with peroxide of hydrogen. A month after the operation, the patient left the clinic with a fistulous orifice, but the vertical diameter of the sinus had decreased to 3 *cm*, and there was only a small flow of pus. In September, 1896, six months after the operation, the patient returned with the fistula completely closed. There was a slight conical depression where the drain had been, but it was so slight that the patient thought it unnecessary to try to remedy it. I saw the patient again in July, 1897. His condition had not changed.

CASE 9.—*Empyema of the left frontal sinus. Fistula of the upper eyelid. Relapse after the trephining of the sinus, done the 12th December, 1895.* (*See N. 111.*)

The patient, B. P., aged forty years, entered the clinic February 23, 1896. Cutaneous fistula under the middle of the eyebrow; movements and fundus of the eye normal. The patient was chloroformed and operated upon, February 23, 1896. As in the preceding case, an angular incision was made in front of the internal extremity of the eyebrow; the tissues and periosteum were raised, and the sinus was opened just above the root of the nose, that is to say, in the same place as the first incision. On examination with the probe, the walls of the sinus were found denuded. Three injections of steam were given, lasting ½ minute each; drainage of the cavity and suture of the wound; no complications. The patient left the clinic two months after the operation, in good condition. There remained, now, only a fistula where the drain had been. This was packed with iodoform gauze. The secretions were scarcely noticeable. In exploring the fistula with a

probe, the sinus presented the form of a canal about 2 *cm* long. The exophthalmos had disappeared, the fundus of the eye was normal. In September, 1896, I received news that the fistula was completely healed. In August, 1897, I saw the patient, who was completely cured. There was but one defect in his appearance—which was a slight longitudinal depression parallel to and above the inner half of the eyebrow.

CASE 10.—*Empyema of the right frontal sinus.*

The patient, Ivan K., twenty-one years old, student at the University of Moscow, entered the clinic February 23, 1896 (*historia morbi*, N. 723).

Considerable ectasia of the right half of the forehead, the skin of which was œdematous. Digital pressure near the middle line of the forehead revealed a softening of the bone, but did not cause pain. The functions of the eye were normal; chronic coryza, polypi of the nasal mucous membrane, and suppuration in Highmore's cavity. The patient stated that the swelling of the forehead began January 11, 1896, with a slight rise in temperature. In the beginning the swelling was intermittent, but finally became permanent. The patient was chloroformed and operated upon, March 4, 1896. As there was no softening of the frontal bone, I had to open the anterior wall of the sinus by making a vertical incision about 4 *cm* long, near the median line of the forehead. On removal of the periosteum, a large quantity of greenish pus was discharged. By means of the curette, the opening was enlarged and the sinus was found to measure horizontally 6 *cm*, vertically 5 *cm*, antero-posteriorly 3 *cm*. This sinus was the largest I had ever operated upon. There was no communication with the nose. Two injections of steam were given, $\frac{1}{2}$ minute each. The drain was put in place, and the wound sutured. A bacteriological examination of the pus showed the existence of streptococci and staphylococci during the period of cicatrization; it was easy to follow the obliteration of the sinus, which gradually filled up with bony tissue. Two months after the operation, the patient left the clinic with a fistula from which came a small quantity of pus escaped. The horizontal measurement of the cavity had decreased to 3 *cm*. At the beginning of October, 1896, seven months after the operation, the patient returned to the clinic. The fistula was completely healed, and there was no suppuration of Highmore's antrum. A complete cure was thus obtained with but little facial deformity, and hardly any depression of the scar. The

patient was shown the 11th and 23d of August, 1897, before the Section of Ophthalmology at the International Medical Congress of Moscow.

The following are **several supplementary details** which I consider useful:

1. The upper internal angle of the orbit should be regarded as the best place to make the small trephine opening in which to inject the steam. The orifice of the fistula may also be used for this purpose.

2. The incision of the skin should be straight, and the diameter of the trephine opening should not exceed 1 *cm.*

3. The injection of the steam should last from $\frac{1}{4}$ to $\frac{1}{2}$ minute, and can be repeated after several moments.

4. This operation is extremely simple, and should not last more than ten minutes. In this respect, no other operation can compare with it. On the other hand, the convalescence is long; five or six months being necessary for a complete obliteration.

I should add, however, that the patient is able to leave the clinic in four or five weeks with very slight suppuration, and only a simple bandage is necessary as dressing. At the end of three or four months this bandage can be replaced by a small piece of adhesive plaster, which does not inconvenience the patient. The post-operative treatment is simple, consisting only of a daily irrigation with peroxide of hydrogen.[1]

The operation I have just described leaves but little facial deformity; much more, however, than after the osteo-plastic method. The depression left by the drain can, if so desired, be excised and improved. A complete cure is always assured, for after the injection of the steam the sinus gradually fills with granulations, which ossify. I was especially able to verify this in the last of my three cases, as the sinus offered much larger dimensions than generally described. I had still further proofs of this in two of my operations on dogs, which I kept alive a year in order to observe the results. I performed the same operation on both of them, February 22, 1896:

[1] For radical cure of other diseases of the nasal cavities I shall later show the possibility of using steam, for example, empyema of the Highmore cavity. As the only trial I have made of this kind on a dog was not satisfactory I shall not describe it. Nevertheless I am persuaded that steam ought to be of service, especially in stubborn cases where there have been frequent relapses.

(1) A longitudinal incision 3 *cm* long; (2) taking away the periosteum and making a small opening with a chisel in the anterior wall of the left sinus; (3) injection of steam lasting one minute; (4) cicatrization per suppurationem.

The fistula closed 6½ months after the operation, leaving a slight depression. These dogs were killed just one year after the operation. Sections of the skull show that the sinuses operated upon are completely filled with a bony tissue resembling a slightly hardened diploë.

Text plate IV, Fig. 3, shows a section of the skull of one of the dogs above mentioned.

While citing these various examples I must consider the question whether or not there is any risk in this treatment by steam. Of course this method cannot be employed if there are any cerebral affections. In all my operations, whether on patients or dogs, I have never noticed that steam had the slightest effect on the brain, nor can I admit that the use of steam, as I propose, may in the long run produce either necrosis or perforation of the posterior wall of the sinus. It offers no more danger than the different chemical caustics proposed by different authors (nitrate of silver, chloride of zinc, etc.). On the contrary, thanks to its antiseptic properties, it destroys pathogenic micro-organisms, which play so great a role in the development of fatal cases.

IV.

Combined method: osteo-plastic opening of the sinus and injection of steam.

My experiments and observations have led me to believe that steam, being such an antiseptic agent, and destroying so completely the mucous membrane, ought to be used more generally, and ought to be an indispensable aid in general surgery. I have used it in two of my osteo-plastic operations.

CASE 11.—*Right frontal sinuitis.*

The patient, M. B., twenty-eight years old, entered the clinic March 27, 1897 (*historia morbi*, N. 939).

There was a slight swelling of the right upper eyelid, and the

tissues of the forehead, above the right eyebrow. Digital pressure on the inferior and anterior wall of the sinus caused considerable pain. There was slight exophthalmos; the movements of the eye, fundus, and visual field were normal. The swelling and exophthalmos had existed for two months. The nose was examined by Dr. Malintine and showed a swelling of the middle turbinal. April 2, 1897, the patient was chloroformed, and the operation performed.

Osteo-plastic opening of the sinus, as described in section II. The sinus was quite large, and contained some pus. I made two injections of steam ¼ minute each. A rubber drain was then put in the nose, the small piece of bone replaced, and the incision sutured, which healed per primam. A daily irrigation of peroxide of hydrogen was made through the drain, and the 5th of May, 1897, the patient left the hospital. The drain was taken out two months after the operation. The swelling and exophthalmos had entirely disappeared; up to the time of present writing, the cure has been perfect, with scarcely any facial deformity. The patient was shown before the Section of Ophthalmology at the International Medical Congress in Moscow, the 11th and 23d of August, 1897.

CASE 12.—*Empyema of the left frontal sinus; mucous polypi.*

The patient, N. G., twenty-three years old, entered the clinic March 31, 1897 (*historia morbi*, N. 991).

No external signs; the eye was in good condition; position of the eye, fundus, and visual field normal; V = 1.0.

Electric lighting of the left sinus gave no positive information. The only symptom was an obstinate flow of pus, from the left nostril, which had been treated for some time by Dr. Malintine, who was good enough to send the case to me. In consulting with Dr. Malintine it was decided to make an exploratory opening of the left frontal sinus.

April 7, 1897, the patient was chloroformed, and the opening made according to the osteo-plastic method. The sinus was very large and contained much pus, and the entire mucous membrane was covered with polypi, some of which were quite large. Three injections of steam were made, each lasting *one minute*. As the fronto-nasal canal was large enough to admit the passage of Cooper's scissors, no drainage-tube was used. The bony flap was put in place and the wound sutured; healing per primam.

The patient left the clinic four weeks later. There was but

little trace of the operation, and no flow of pus from the nose. This case was of special interest, as on account of the size of the fronto-nasal canal I decided to do away with the drain for the passage of the pus. The experiment succeeded perfectly. This manner of treatment applies, of course, only to certain cases, still when it is practicable it simplifies greatly the operation and course of treatment.

V.

Conclusions.

In using the methods described in this article, my aim has been *to obtain a complete obliteration of the frontal sinus with as little facial deformity as possible.* Further experience will show which of these methods will yield the best results, and in which cases.

The following are my final conclusions:

I. As the complete obliteration of the frontal sinus is easy to accomplish, it ought to be adopted as the base of operation, and on account of offering a sure guaranty against relapses. This obliteration can also be made without injury to any of the bony walls of the sinus.

II. It is wise to broaden the operative field in lesions of the frontal sinus in order to prevent complications.

III. In all cases of empyema of the frontal sinus, combined with affections of other cavities (Highmore's antrum and the ethmodial cells), it is wiser to begin by treating the sinus, for this, on account of its position, presents a source of secondary affections for the above-named cavities.

IV. The operative method best suited to each individual case should be chosen.

V. Simple trephining with curettement of the mucous membrane is uncertain. Several cases have been cited where after such treatment there have been relapses.

VI. Kuhnt's method, in principle, is a valuable acquisition to the surgery of the frontal sinus, and it is most indicated in cases complicated with cerebral symptoms, and also where there is necrosis of the anterior wall.

VII. The osteo-plastic method, with the modifications I have proposed, is preferable in all simple cases and in

exploratory operations, as it leaves but little facial deformity.

VIII. In all neglected cases suppurating freely, as well as in relapses the result of former operations, the use of steam is most valuable, as it offers a sure though slow obliteration of the sinus.

IX. Steam may also be used as an aid in the osteo-plastic operations.

X. Peroxide of hydrogen is an excellent post-operative remedy. On account of the vaporization of the oxygen it penetrates all parts of the sinus.

XI. The drain tube should be kept at least two months in the nose, as the bony granulations form very slowly.

XII. In particular cases with large fronto-nasal cavities, the traditional drainage may be dispensed with, as described by me in my last case.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD QUARTER OF THE YEAR 1897.

By Dr. ST. BERNHEIMER, in Vienna; Profs. C. HORSTMANN and P. SILEX, in Berlin;

WITH THE ASSISTANCE OF

Dr. S. M. Burnett, Washington; Dr. Dantone, Rome; Dr. Herrnheiser, Prague; Prof. Hirschmann, Charkow; Dr. P. von Mittelstädt, Metz; Dr. Sulzer, Geneva; Dr. L. Werner, Dublin; Dr. C. H. A. Westhoff, Amsterdam; Dr. Schiötz and Dr. Ole Bull, Christiania; Dr. Greeff and Dr. Deus, Berlin; and others.

Translated by Dr. Ward A. Holden.

(Continued from the March number.)

Sections XII.–XXI. Reviewed by Dr. SILEX.

XII.—IRIS.

241. Schirmer. Studies on the pathology of the width of the pupil and of the centripetal pupillary fibres. *Graefe's Archiv*, xliv., 2, p. 358.

242. Benoit. On the rôle of the aqueous humor in the endogenous infections of the iris. *Arch. d'opht.*, xvii., 7, p. 409.

243. Stoewer. Iridotomy in closure of the pupil due to complete adhesion to a corneal scar. *Centralbl. f. Augenheilk.*, xxi., p. 239.

244. Schapringer. A case of polycoria and coloboma of the iris (presentation of patient). *New-Yorker med. Monatschr.*, June 20, 1897.

245. HENNICKE. A case of isolated rupture of the iris without injury to the coats of the ball. *Correspondenzbl. des allg. aerztl. Vereins von Thüringen*, 1897.

246. MAYWEG. Sarcoma of the iris. *Report of Heidelberg Oph. Soc.; Arch. f. Augenheilk.*, xxxv., 4, p. 341.

247. LUBOWSKI. On tuberculosis of the eye. *Ibid.*, xxxv., 3–4, p. 183.

248. ZIMMERMANN, W. Remarks on Schultze's case of tubercular iritis and parenchymatous keratitis. *Graefe's Archiv*, xliv., 2, p. 258.

249. DE SCHWEINITZ. Traumatic prolapse of the iris and its treatment. *Med. News*, July 3, 1897.

250. ZIMMERMANN, M. W. A case of bilateral melanotic tumors, probably cysts of the ciliary bodies. *Annals of Oph. and Otol.*, July, 1897.

After making extensive clinical investigations SCHIRMER (241) concluded that the pupillary fibres are separate from and independent of the visual fibres, and that their end organs are probably the para-reticular cells of the retina. They terminate for the most part in the macula and its neighborhood, and seem to run in the optic nerve near the visual fibres of the corresponding parts of the retina. The physiological width of the pupil is the result of a reflex contraction of the sphincter. The pupillary fibres in the optic nerve are more resistant to compression than the visual fibres, but diffuse inflammatory processes affect the two in equal measure. Diseases of the retina affect the pupillary fibres only when the inner layers are involved, and diseases of the choroid affect them only when there is an accompanying disease of the retina. In the so-called amblyopias, hysterical, congenital, and the like, the function of the pupillary fibres is not involved.

According to BENOIT (242) the aqueous humor is the carrier of infection for the iris. In syphilis, rheumatism, and all diseases in which vascular changes are frequent, the vascular ciliary body readily becomes inflamed. There is extensive inflammatory œdema and cellular infiltration of the ciliary processes. The aqueous humor secreted there contains, besides pus cells and fibrin, micro-organisms and toxins which infect the iris through the crypts, which are most numerous near the pupillary and ciliary margins. A description of the microscopic findings in two eyes is given. v. MITTELSTÄDT.

LUBOWSKI (247) gives a clinical and microscopic report of a case of tubercular iritis and cyclitis with increased tension which caused so much pain that enucleation was necessary. It is noteworthy that only the lower half of the retina was diseased and degenerated.

According to ZIMMERMANN (248), it is not correct to assume, as Schultze does, that in parenchymatous keratitis the affection of the cornea is brought about by the action of toxins in the anterior chamber which takes place after the stripping off of the endothelium. It is much more probable that the affection arises in other ways, *e. g.*, through the blood-vessels or because of disease of the vessel walls.

After a discussion of the many aspects of the question with illustrative cases, and recognizing the difficulty in laying down any fixed rules for our guidance, DE SCHWEINITZ (249) offers the following as probably the most generally applicable: Whenever it is possible to secure clean removals of the protruding tissue, operative interference is indicated; when this is not possible, non-operative measures are worthy of consideration—that is, rest, atropine, and a compress bandage. Eserine is not usually indicated.

BURNETT.

The chief feature of interest in ZIMMERMANN'S (250) case is that though the growths, which evidently came from the ciliary bodies and projected between the irides and lenses, had all the appearance of malignancy, they have remained stationary for four years. Good chromo-lithographic pictures of the condition accompany the paper. They are supposed to be cystic.

BURNETT.

XIII.—CHOROID.

251. GRUSSENDORF. A contribution to the knowledge of metastatic ophthalmia. *Inaug. Dissert.*, Jena, 1897.

252. BRADZKI. Ophthalmomalacia. *Inaug. Dissert.*, Berlin, 1897.

GRUSSENDORF (251) describes a unilateral metastatic ophthalmia of the right eye following a case of Ludwig's angina in a laborer, 38 years of age, that had been cured by incision of the right side of the neck. Suddenly, without any cause, the right side of the neck again became swollen, and with this the right eye became affected, there being hyperæmia and œdema of the conjunctiva, inflammatory exophthalmus, diffuse opacity of the cornea, myosis

and hyperæmia of the iris, and an elevation on the ball. The blind eye was enucleated on account of pain. Microscopic examination revealed slight cellular infiltration of the cornea, a fibrinous exudation in the anterior and posterior chambers, plastic irido-cyclitis, a circumscribed abscess in the vitreous with perforation of the choroid and sclera, detachment of the retina, and thrombosis of the central vein. The points of interest are that it is the first case of metastatic ophthalmia observed after Ludwig's angina, that the blindness did not come on suddenly, as in embolism, and that the purulent process was localized.

BRADZKI (252) collects all that has become known in regard to ophthalmomalacia, which he defines as a transient or permanent hypotony of the ball, accompanied by multiple symptoms of paralysis or excitation in the sphere of the cervical sympathetic and the trigeminus.

XIV.—GLAUCOMA.

253. ANGELUCCI. Further remarks on disturbances of the vascular mechanism and on the operability of buphthalmus. *Arch. d. Ottalm.*, iv., 11–12, p. 343.

254. HOFFMANN. The therapy of glaucoma. *Zehender's klin. Monatsbl.*, xxxv., p. 251.

255. LESSHAFT. Spontaneous expulsion of the transparent lens after iridectomy for glaucoma. *Ibid.*, p. 273.

256. CROSS. Congenital hydrophthalmus. *Trans. Ophth. Soc. Un. King.*, xvi., p. 340.

ANGELUCCI (253) briefly gives the clinical history of 10 further cases of buphthalmus, and repeats his previously expressed views in regard to its causes, which lie, he thinks, in a mechanical (vasomotor) disturbance of the blood-vessels. In fact, in all these patients other nervous alterations were discovered. In two infants, one fifteen and the other forty-five days old, the author performed iridectomy on both eyes, which prevented the further development of the disease and caused the cornea to clear up. One of the children in particular when again examined, at the age of four years, had quite useful vision. DANTONE.

In HOFFMANN'S (254) case, after iridectomy for glaucoma in a blind eye, the previously healthy eye was attacked. No operation was allowed, and the patient instilled pilocarpine daily for ten years. the sight gradually failing. From this and other observations the author pleads for operation when the patient cannot

constantly be kept under observation and when myotics do not definitely relieve the attacks.

LESSHAFT (255) made an iridectomy for glaucoma. On the sixth day the chamber had not been restored, and there was severe intercurrent pain. On the seventh day the chamber was deep and the wound closed, but in the night the patient had a feeling of tension and the lens was found in the dressing.

CROSS (256) describes the microscopic appearance in 3 cases of buphthalmus. The filtration angle in all the specimens was defective. In two there was adhesion of the iris to the periphery of the cornea, and in one strands of tissue suggestive of former contact. The paper is illustrated by six very good micro-photographs. Treacher Collins pointed out that if the iris, during development, fails to separate from the cornea, a congenital ant. synechia may result. Devereux Marshall showed a specimen in which the angle was closed in spite of a deep ant. ch.

WERNER.

XV.—SYMPATHETIC OPHTHALMIA.

257. DONALDSON, E. A case of sympathetic inflammation of the eye following enucleation for subconjunctival rupture of the sclerotic. *Ophth. Review*, xvi., p. 35.

DONALDSON'S (257) patient, a woman, æt. thirty-three, struck her eye against the latch of a door, producing a rupture of the sclerotic above the cornea. Conjunctiva not torn. Enucleation twenty days after injury. Sympathetic inflammation set in twenty-seven days after operation and forty-seven after the injury. There was slight iritis and K. punctata on and off, until three years later she got catarrhal ophthalmia which aggravated the iritis. Six years after onset V = $\frac{4}{6}$. Some post. synechiæ; media obscure.

WERNER.

XVI.—LENS.

258. SCHANZ. A family with juvenile cataract. *Centralbl. f. Augenheilk.*, xxi., p. 264.

259. HIRSCHBERG. Congenital cataract as a family affection. *Ibid.*, p. 271 (reports of five families).

260. PURTSCHER. Congenital cataract as a family affection. *Ibid.*, p. 198.

261. ROGMANN. A new contribution to the study of congenital anomalies of the lens. Colobomas situated in directions

not corresponding to the fœtal cleft. General conclusions on the genesis of lenticular coloboma. *Arch. d'opht.*, xvii., p. 427.

262. KRAUTSCHNEIDER. A case of crystal formation in the lens. *Beiträge z. Augenheilk.*, xxvi.

263. SCHOEN. On cataract following convulsions. *Wiener med. Wochenschr.*, 1897, No. 17.

264. PUCCIONI. A case of spontaneous luxation of both lenses. *Boll. d'ocul.*, xviii., 14–15, p. 108.

265. SCHLODTMANN. On a case of luxation of the lens into Tenon's space after an equatorial rupture of the sclera. *Graefe's Archiv*, xliv., 1, p. 126. (Detailed anatomical description.)

266. MITVALSKY. Remarks on subconjunctival luxation of the lens. *Arch. d'opht.*, xvii., p. 337.

267. CHIBRET. Lavage of the posterior chamber after cataract extraction. *Arch. d'opht.*, xvii., p. 545.

268. SATTLER. On the operative treatment of ectopia lentis. *Report of Heidelberg Ophth. Soc.*, 1897; *Arch. f. Augenheilk.*, xxxv., 4, p. 355.

269. PURTSCHER. Choroidal hemorrhage after extraction of senile cataract. *Centralbl. f. Augenheilk.*, xxi., p. 193.

270. FREYER. The technique of cataract extraction. *Amer. Journ. of Ophth.*, July, 1897.

SCHANZ (258) reports on a family in which the three children of a healthy mother became blind transiently about their twentieth year from total cataract which developed in a few months.

PURTSCHER (260), in a family with 11 children, the parents being healthy, found cataract in the 4th, 7th, and 11th child.

In ROGMANN'S (261) case of lenticular coloboma in the left eye (the right lens having suffered a traumatic dislocation), the upper edge of the lens had a straight margin, and the lens was luxated inward and downward. The iris was reduced to a strip 1½ *mm* broad. v. MITTELSTÄDT.

SCHOEN (263) remarks that he, as well as Mettendorf, had attributed lamellar and ergotine cataract to spasm of the ciliary muscle. In such cases he supposes the opacity of the lens to consist of altered epithelium and the distribution of the opaque stripes to follow the arrangement of the zonula fibres.

PUCCIONI (264) describes a case of bilateral luxation of the lens in a young peasant girl. The lens was dislocated upward and inward in one eye and upward and outward in the other.

Since she was much disturbed by asthenopia both lenses were extracted by means of a small flap operation. There having been no trauma and the eyes being otherwise healthy, the author thought the condition to have been brought about by the patient's habit of carrying heavy objects on her head. The straining of the muscles of the neck might so increase the intraocular tension that a weak zonula would be ruptured. DANTONE.

Among the 13 cases of subconjunctival luxation of the lens observed by MITVALSKY (266), with removal of the lens by operation in 9, the rupture of the ball was in 9 cases an indirect typical rupture in the region just behind the sclero-corneal margin, while in the other cases a wound of the conjunctiva had also been produced by the object striking the eyes. Only in one case did the lens lie partly in the scleral wound. Probably in this case the sclera was pressed against the upper orbital wall at the time of injury, and the escape of the lens was thus prevented. Luxation without the capsule was seen in but one case, and here there had been nuclear cataract since childhood. The capsule of the dislocated lens unites with the surrounding conjunctiva, the vessels of which pass through the capsule and lead to absorption of the swollen mass. The time required for absorption varies in different conditions. Absorption is quickest when the capsule is ruptured, the scleral wound open, and the lens in contact with the aqueous. A partly dislocated lens with intact capsule is absorbed more slowly. After absorption a cystic sac may remain. In one case a dislocated lens became chalky. The scar after rupture of the sclera is sometimes linear, sometimes ectatic. It may be pigmented. At times the wound may remain open for months The curvature of the cornea is always altered. The iris was in but one case uninjured, in most cases there was a large coloboma, or the iris passed through the wound with the lens. The ciliary body was torn once in an equatorial direction, three times in a diagonal. The lens should be removed as soon as the blood is sufficiently absorbed to allow it to be seen. A suture should be applied. Only in 2 cases was vision preserved. There was no sympathetic ophthalmia. v. MITTELSTÄDT.

CHIBRET (267) has devised a double syringe having one canula which can be passed behind the iris to wash out the remaining lens masses from the capsule and a second canula to lie in the anterior chamber, which removes these masses from the eye by aspiration. v. MITTELSTÄDT.

PURTSCHER (269) describes a case of choroidal hemorrhage coming on 6 hours after a normal operation for senile cataract. It was brought about by the patient's blowing his nose.

In a second case, that of a man forty-seven years of age with secondary glaucoma and ulceration in an old corneal scar, a hemorrhage from the posterior portion of the choroid caused the ulcer to burst and the lens, vitreous, retina, and choroid to protrude through the cornea.

FREVER (270) is not an advocate of the simple extraction of cataract. He deems the preliminary iridectomy the safer operation and the one to be commended for general use. BURNETT.

XVII.—VITREOUS.

271. DAVIS, A. E. Vicarious hemorrhages into the eyes at the menstrual periods—report of a case. *Oph. Record*, July 18, 1897.

272. GILES, J. E. A case of persistent hyaloid artery. *Manhattan Eye and Ear Hosp. Rep.*, January, 1897.

In DAVIS'S (271) case a woman of twenty-two, in whom the menstrual function did not appear until she was twenty-one, and was very scanty, had a large hemorrhage into the vitreous. A year before she had had a sudden obscuration of vision in the other eye. The fundus of the eye is now normal. The woman is otherwise in good physical condition. BURNETT.

In GILES'S (272) case a band passed from the temporal side of the disk forward and joined a grayish mass attached to the temporal side of the posterior lenticular capsule. In this band were two vessels, one starting from the surface of the disk and running along the upper border its entire length, the other following the lower border, but interrupted in its course for a part of the way. BURNETT.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

273. HIRSCH. On embolism of a branch of the retinal artery. *Wiener klin. Rundschau*, 1897, No. 32.

274. HAAB. On traumatic affections of the macula due to the electric current. *Zehender's klin. Monatsbl.* XXXV., p. 213.

275. HALE, B. A case of pulsation of the central artery of the retina dependent upon an aneurysm of the ascending aorta, the innominate, and the subclavian. *Zehender's klin. Monatsbl.*, XXV., p. 239.

276. HIRSCHBERG. Peculiar degeneration of all the retinal vessels. *Centralbl f. Augenheilk.*, xxi., p. 206.

277. WAGENMANN. On circulatory disturbances in the retinal vessels. *Graefe's Archiv*, xliv., 2, p. 219.

278. THOMAS, S. Detachment of the retina with glaucoma simulating neoplasm in an eye with an old injury. *Arch. d'opht.*, xvii., p. 474.

279. INTRZENKO. On the operative treatment of detachment of the retina according to Deutschmann's method. *Wiener med. Wochenschr.*, 1897, No. 20.

280. ANDOGSKY. On the condition of the visual purple in detachment of the retina. *Graefe's Archiv*, xliv., 2, p. 404.

281. SCHMIDT-RIMPLER. On the theory and treatment of detachment of the retina. *Deutsche med. Wochenschr.*, No. 44, 1897.

282. PAPOW. On the pathology of tobacco-amblyopia. *Wojenno med. Journ.*, No. 5, 1897.

283. COWL and LEVY-DORN. On the perception of light under the action of the Roentgen rays. *Berl. physiol. Gesellschaft*, 1897.

284. HILBERT. A case of colored taste (Geschmack-photismen). *Zehender's klin. Monatsbl.*, xxxv., p. 271.

285. KOSTER. Erythropsia. *Nederlandsche Oagheelk. Bydragen*, Afl. 4, 1897.

286. SNELLEN. Erythropsia. *Graefe's Archiv*, xliv., 1, p. 19.

287. ANTONELLI. Transitory amblyopia. German by O. Nieser. Halle, A. Marbold, 1897.

288. HINSHELWOOD, J. A case of recovery from albuminuric retinitis, with remarks as to prognosis. *Brit. Med. Journ.*, May, 1897, p. 1154.

289. FISHER, J. H. A case of subhyaloid hemorrhage in which the specimen was obtained, with microscopic sections (illustrated). *Royal London Ophth. Hosp. Reports*, xiv., p. 291.

290. CLAIBORNE. A case of embolism of a branch of the central retinal artery. *Ophth. Record*, Aug., 1897.

291. DE SCHWEINITZ. Angioid streaks in the retina—second communication. *Ibid.*, July, 1897.

292. DUNN. Partial detachment of the supero-temporal vein of the retina. *Annals of Ophth.* July, 1897.

293. WEBSTER. A case of prolapse of the retina following iridectomy for glaucoma. *Manhattan Eye and Ear Hosp. Reports*, Jan., 1897.

294. CLAIBORNE. A probable case of thrombosis of the lower central retinal vein. *Ophth. Record*, Sept., 1897.

A series of observations has led HIRSCH (273) to the conclusion that the macula is supplied by small vessels from the main trunk, and by twigs from the upper and lower principal branches. Embolism of the vessel supplying any one of the three regions of the retina will cause a scotoma and partial atrophy of the nerve, but will not affect the central acuteness of vision. Blindness in the centre of the retina will be caused always by embolism of all three nutrient vessels, or by embolism of the main trunk behind the point where the first branches are given off.

HAAB (274) reports the case of a patient through whose eyes had passed an electric current of unknown strength. For a short time he was blind. There were changes at the macula in the right eye which passed away in two months. These changes consisted in a delicate milky opacity in the entire macular region, and of a number of yellowish-white spots of irregular form and varying size, similar to those seen in old people and called colloid excrescences of the lamina vitrea.

HIRSCHBERG'S (276) case was one of albuminuric neuro-retinitis in which all the vessels exhibited irregular light-colored sheaths.

WAGENMANN (277) reports on a case of recurrent blindness in which, in the course of an attack, he found complete ischæmia of the retinal arteries, due to vascular spasm. The cause was supposed to be arterio-sclerosis.

THOMAS'S (278) patient, aged seventeen, had lost the sight of the left eye from injury in infancy, and when seen the eye had increased tension, and behind the lens lay a non-pigmented, non-vascular mass which was taken to be a tumor. After enucleation there was found an extensive detachment of the greatly altered retina, which was distorted by cicatricial choroidal bands.

V. MITTELSTÄDT.

INTRZENKO (279) reports on ten cases. In a case in which rabbit's vitreous was injected, the detachment became complete. Nor did cutting through the retina and vitreous lead to any result.

SCHMIDT-RIMPLER (281) places in opposition to Leber's retraction theory and Raehlmann's diffusion theory his own theory

of inflammatory exudation from the choroidal vessels. He does not favor the operative methods of Schoeler or Deutschmann, but relies on the pressure bandage, with rest on the back, diaphoresis or mercurialization, and sometimes puncture of the sclera.

PAPOW (282) made long-continued experiments with nicotine injections in rabbits. The ophthalmoscopic findings were mostly negative, and reduction of vision was not evident. The microscopic changes found in the retina were neither well marked nor characteristic, being the same as have been found in cases of starvation, alcohol poisoning, icterus, uræmia, and other processes.

COWL and DORN (283) have shown conclusively by careful tests that the perception of light under the action of the X-ray, which has been described by some authors, belongs in the sphere of subjective light perception, the perceptions occurring even when the visual field is wholly dark. Therefore the reports of the favorable effect of the X-rays on some sorts of blindness are not deserving of credit.

HILBERT (284) reports that his seven-year-old daughter associates the taste of good milk with the color yellow, unpleasant tastes with the color brown, and very disagreeable tastes with gray or black.

With a large pupil and intense illumination from all sides, a certain amount of light passes in between the iris and lens and falls upon the ciliary processes, which are full of blood, thus illuminating the periphery of the retina with a purple-red light. By simultaneous contrast, according to KOSTER (285), objects forming images on the central portion of the retina take on, in bright light, a greenish-yellow color, and when a dark room is entered, by successive contrast objects appear purple-red.

WESTHOFF.

SNELLEN (286) believes, from his experiments, that erythropsia is to be explained by the action of after-images and contrast, provided that there is an intense colored illumination of a portion of the percipient organ. The objective source of the red color may perhaps be sought in the translucency of the eyelids and the ocular coats.

ANTONELLI's (287) conclusions are as follows :

1. It seems best to use the term "transitory amblyopia" in place of such designations as "scintillating scotoma," and the like. Only when the entire clinical picture of migraine or partial

epilepsy precedes, is it justifiable to add to the diagnosis of migraine, transitory amblyopia as an epiphonema.

2. In the majority of cases the amblyopia, like the migraine, may be attributed to nervous disturbances of a purely dynamic character.

3. Transitory amblyopia is characterized by various visual disturbances, such as hemianopsia, peripheric symmetrical scotoma, central scotoma, amblyopia, and even total amaurosis. The disturbances come and go, more or less abruptly; often there is an accompanying feeling of giddiness.

4. Transitory amblyopia is a very frequent affection. The attacks as they occur in persons with gout, hemorrhoids, anæmia, etc., are due to transient vaso-motor disturbances in the brain, of which we have as yet but little knowledge. The affection is most frequent in adults, and more frequent in women than in men. Heredity plays some part in its production. The determining causes are chiefly hunger, constipation, work, acute cardiac weakness, psychic disturbances, nasal polypi, dazzling with light, approach of the menses, and the like.

5. The migraine is always on the side opposite the affected halves of the fields. Most frequently the cortical visual centre in the left hemisphere is involved, causing right hemianopsia or scotoma scintillans. Any accompanying symptoms will be located on the left side.

6. Transitory amblyopia is to be classed among the subjective visual disturbances. Only in cases of long duration can the form and extent of the scotoma be made out with the perimeter. As to prognosis, it is difficult to say anything positive.

7. As to treatment, bromides, quinine, digitalis, hydrotherapy, etc., may be mentioned. A horizontal posture and closure of the eyes are useful in cutting short the attacks, also alcohol, tea, coffee, and cold applications to the face.

HINSHELWOOD'S (288) patient, a woman of sixty-five, had an attack of acute Bright's disease in October, 1893, with general œdema, headache, convulsions, ending in coma, which lasted several days. She recovered after two months. In January, 1895, her vision failed: typical albuminuric retinitis in both eyes, with bright spots at median line and peripheral hemorrhages. A year later, the only appearances were a slight mottling at the median line and a few peripheral pigment spots. Her condition was the same three years later. V normal, health excellent. The author points

out that this is an exceptional case, and that the prognosis in albuminuric retinitis must depend largely upon the character of the renal affection, being more favorable in acute or subacute nephritis. WERNER.

FISHER (289) first reviews the various ideas as to the origin and position of these hemorrhages in the macular region, and states that his is the first case in which a microscopic examination was made. The patient was a woman about sixty. There was bleeding from the nose. Systolic apical murmur, pulse tense. Heavy trace of albumen in urine. Sight failed suddenly in right eye. V = motion of hand. Semicircular hemorrhage at median line, upper border on a level with centre of disk, sharply defined and gray, lower border fringed; smaller hemorrhage below. Patient died from cerebral hemorrhage. The eye was hardened in 10 per cent. formol. The sections show that the hemorrhage was retinal, that it detached the internal limiting membrane, and accumulated under it. In places the blood had burst through one or both membranes. WERNER.

CLAIBORNE (290) reports a case of embolism of the branch of the lower division of the central retinal artery going to the macular. There was a small central scotoma, which remained permanent, and that side of the optic nerve became much whiter than normal. V = $\frac{20}{50}$. BURNETT.

DE SCHWEINITZ (291) reports a second case of the so-called angioid streaks in the retina which can be clearly traced to hemorrhages into the retinal substance. There were fresh hemorrhages in the right eye, while the left presented a typical picture of the anastomosing brownish streaks which characterize the disease, and it is illustrated by a fine chromo-lithograph. BURNETT.

This is the second instance DUNN (292) has seen of detachment of a retinal vessel not accompanied by detachment of the retina itself. BURNETT.

WEBSTER'S (293) case was a girl of seventeen, with the ophthalmoscopic signs of glaucoma in the left eye, with only p. l. After the iridectomy, and while the wound was being cleaned, vitreous began to escape. The eye was immediately closed and bandaged. The next morning the dressing was saturated with blood and a mass which proved to be the retina was protruding through the open wound. This was snipped off after a few days, and the eye went on to atrophy. The bleeding evidently came from the choroid. BURNETT.

In CLAIBORNE'S (294) case the lower central retinal vein was enormously swollen and tortuous and there was a small hemorrhage between the macula and the disk. The visual field was limited to a small spot at central fixation and the nerve head in time became white. The swelling of the vein disappeared in the course of some weeks. No cause is assigned for the condition.

BURNETT.

XIX.—OPTIC NERVE.

295. NOTTBECK. A contribution to the knowledge of congenital pseudo-neuritis. *Graefe's Archiv*, xliv., 1, p. 31.

296. HOCHE. On the question of the pathogenesis of choked disk. *Archiv. f. Augenheilk.*, xxxv., 3–4, p. 192.

297. KRÜCKMAN. On the pathogenesis of choked disk. *Report of Heidelberg Ophth. Soc.*, 1897 ; *Archiv. f. Augenheilk.*, xxxv., 3–4, p. 339.

298. NEUMANN. Papillo-retinitis in chlorosis. *Inaug. Dissert.*, Berlin, 1897.

299. JULES. A case of monocular neuro-retinitis with microscopic examination. *Archiv. d'opht.*, xvii., 1897, p. 543.

300. FLINTZER. On retrobulbar neuritis. *Inaug. Dissert.*, Jena, 1897.

301. HIGIER. Clinical remarks on family affections of the optic nerve. *Deutsche Zeitschr. f. Nervenheilk.*, x.

302. SHAW, C. E. A case of optic neuritis after perforating wound of the eyeball. *Ophth. Review*, xvi., p. 107.

303. VAN FLEET. A case of alcoholic amaurosis. *Manhattan Eye and Ear Hospital Reports*, January, 1897.

NOTTBECK (295) again calls attention to that congenital condition of the optic disk which suggests the presence of neuritis. This is found about 20 times in 10,000 patients. Continued observation shows that at no stage is there really inflammation. The pupillary margins are indistinct, particularly above, below, and inward ; there is a radial striation of the disk and its margins ; and frequently there are slight hyperæmia and projection of the disk, yet without tortuosity of the vessels. Hyperopia and astigmatism usually exist.

In regard to the nature of choked disk HOCHE (296) expresses his views as follows : The influence of toxins in cases of simple tumor without meningitis and fever is neither proven nor probable. The changes in the nerve as well as analogous processes in

the spinal cord at the posterior roots seem to be due merely to the mechanical increased pressure. The œdematous optic nerve becomes constricted in the region of the lamina cribrosa, and through the removal of the trophic influences of the ganglion cells a degeneration of the optic fibres is brought about, extending from the lamina cribrosa in both directions.

NEUMANN (298) collects six cases and adds two of his own. One was complicated with such marked general disturbances that even neurologists believed the case to be one of brain tumor.

In JULES'S (299) case a man of fifty-two, who had acquired syphilis two years before and had been treated with mercury and iodide of potassium, became blind in the left eye without external manifestations. There was still a low degree of iritis with total posterior synechia, but without increased tension although there was severe pain. The fundus could not be seen. In the eyeball, which was enucleated for suspected tumor, there was found a marked inflammation of the disk and retina and optic nerve, the latter being thickened to twice its natural size.

Soon after the enucleation, which relieved the pain, symptoms appeared on the part of the skin, mucous membranes, and digestive tract which yielded to specific treatment. The author believes that in many cases of retrobulbar neuritis that are etiologically obscure the lesion is a similar optic-nerve affection of a milder grade which would yield to specific medication.

v. MITTELSTÄDT.

FLINTZER (300) reports on two cases of acute retrobulbar neuritis of rheumatic origin ending in a gray discoloration of the disk but with normal vision, and on three cases of syphilitic neuritis.

HIGIER (301) reports the histories of two brothers having bilateral optic neuritis with bluish discoloration of the temporal halves of the disks. An uncle on the mother's side had been affected with the same trouble. The nature and the location of the inflammatory process in this family affection are unknown.

Very similar is another sort of optic-nerve affection, namely, the hereditary specific optic neuritis.

Two cases are then reported of optic-nerve atrophy, one in a girl of twelve and the other in her eight-months-old brother. Since no etiological factors could be discovered, this form of disease must be considered an hereditary or a congenital genuine atrophy affecting all the fibres and not being accompanied by inflammatory symptoms.

Finally the author reports the case of a nine-months old infant suffering from a peculiar nervous disease of which two other children of the family had died. The course of the disease may be divided into three periods:

1. Beginning in the third or fourth month with disturbance of vision and muscular weakness; ophthalmoscopically symmetrical degeneration of the macula lutea. [Amaurotic family idiocy, B. Sachs.]

2. Increased muscular weakness, optic nerve atrophy, and decrease in vision.

3. Atrophy of the musculature, marasmus. Death in the second or third year of life.

The etiology is entirely obscure. [See report of the Section of Ophthalmology of the N.Y. Academy of Medicine, these ARCHIVES, this volume, No. 2, p. 239.]

SHAW's (302) patient, a boy aged eight, ruptured the inner margin of the left cornea by falling on a stick one month before. A portion of prolapsed iris was excised, the wound was healed; iris clear; slight ciliary congestion. Tn. A few streaks of opacity in vitreous. Distinct optic neuritis. The eye gradually softened and shrank and was enucleated. Sections showed well-marked neuritis. No micro-organisms found. WERNER.

The peculiar features of VAN FLEET's (303) case of alcoholic amaurosis were the form of the visual field which was lacking on the nasal side in both eyes, and the large quantity of strychnia (two-thirds of a grain twice a day) which was given before the effects were perceived. Even these doses were not able to bring about a permanent improvement and the patient became totally blind and the nerve atrophic. BURNETT.

XX.—INJURIES, FOREIGN BODIES (PARASITES).

304. ZIEM. A case of contusion of the ball with rupture of the optic nerve. *Centralbl. f. Augenheilk.*, xxi., p. 209.

305. WAGENMANN. On gun-cap injuries of the eye. *Graefe's Archiv*, xliv., p. 273.

306. FRIDENBERG, P. A case of shot injury of both eyes. Discovery of the foreign bodies by means of skiagraphy. *Deutsche med. Wochenschr.*, No. 46, 1897.

307. ISBRUCK. On shot injuries of the eye. *Inaug. Dissert.*, June, 1897.

308. PICCOLI. Cysticercus cysts of the orbit. *Lav. di Clinica Ocul. d. R. Univ. di Napoli*, v, 1, p. 100.

309. BOBRICH. On the decreased visual efficiency following eye injuries. *Inaug. Dissert.*, Berlin, 1897.

310. DUNN, H. P. Grass spikelet in the conjunctival sac of a child, suppuration of the cornea; collapse of the eyeball. *Brit. Med. Jour.*, No. 1883, p. 262.

311. MARSHALL, C. D. Extraction of a piece of metal from the vitreous with the electro-magnet; retention of good vision. *Trans. Ophth. Soc. Un. K.*, xvi., p. 358.

312. TWEEDY, JOHN. Numerous foreign bodies in an eye retaining normal vision. *Ibid.*, p. 360. [Fragments of glass imbedded in the fundus.]

313. WORRELL, T. P. Passage of a shot through the eyeball. *Ophth. Record*, Aug., 1897.

314. CARHART, W. M. D'A. A case of traumatic blindness with partial recovery of vision after fifteen months. *Manhattan Eye and Ear Hospital Reports*, Jan., 1897.

The contusion described by ZIEM (304) was caused by a blow on the upper lid from a blunt nail. Apart from a small tear in the lid and bulbar conjunctiva, there was no rupture in the walls of the ball or in its interior, but the optic nerve was torn off close behind the ball.

WAGENMANN (305), in confirmation of Leber's statement that particles of copper penetrating the lens and remaining there may be well borne and even not give rise to total opacity of the lens, cites a case in which twenty-five years after such an injury a total cataract developed, and after extraction the foreign body was found in the lens.

FRIDENBERG (306), by illuminating the head along two lines at right angles, could accurately locate the shot; the eyes were too severely injured to permit the saving of any vision.

In one of ISBRUCK'S (307) cases a shot passing through the upper lid entered the eye near the equator and passed out near the disk. Recovery with final V = $\frac{2}{3}$.

PICCOLI (308) describes in detail an orbital cysticercus cyst removed from a girl of six. The growth was as large as an almond, lay adjacent to the ball, and could be seen projecting in the lower cul-de-sac when the lid was drawn down. Only four cases of cysticercus of the orbit have been reported. DANTONE.

In DUNN's (310) case, a child æt. three, the cornea had sloughed and lying on its remains was found a spikelet of grass. The author used 1:1000 sol. of chinosol, which is non-toxic, non-caustic, and does not coagulate albumen. He alludes to the rarity of foreign bodies in the eyes of children as compared with adults. WERNER.

The chief point of interest in WORRELL's (313) case is that after the passage of a No. 4 shot through the eye, entering the cornea near the limbus, vision of $\frac{15}{20}$ was regained after some months, with only a slight restriction of the visual field. Two years later an attack of inflammation reduced it to $\frac{10}{100}$, and some twelve years after the accident vision was entirely lost, with a white chalky lens. The patient was a boy fourteen years old at the time of the accident. BURNETT.

CARHART's (314) patient received a heavy blow over the vertex, to the right of the median line. Unconsciousness and convulsions followed, continuing for many months; there were also left leg and arm paralyses. Blindness lasted fifteen months, and then slowly passed off. At time of examination, three years after injury, V: R, $\frac{20}{30}$; L, $\frac{20}{40}$. V.FF. concentrically narrowed; no ocular paralyses. Nerve healthy, and no hemiplegia or hemianæsthesia. He locates the lesion on the right side near the internal capsule, where alone it could be and the symptoms be what they were. BURNETT.

XXI.—OCULAR DISTURBANCES IN GENERAL DISEASES.

315. BERGER. Remarks on some ocular troubles dependent upon the general condition of the body. *Arch. d' opht.*, xvii., 1–8, p. 479.

316. BALLABAN. Bilateral hemianopsia with the preservation of a small central field of vision. Referred to in *Centralbl. f. Augenheilk.*, xxi., p. 275.

317. LANZ. Two cases of cortical and psychic blindness. *Deutsche med. Wochenschr.*, 1897, No. 38.

318. DIMMER. Bilateral exophthalmus with relative temporal hemianopsia. *Wiener klin. Wochenschr.*, 1897, No. 17.

319. STEINER. The peculiarity of the clinical picture in Basedow's disease in children. *Wiener med. Blätter*, 1897, No. 6.

320. HITSCHMANN. A case of acromegaly with peculiar ocular conditions. *Ibid.*, No. 26.

321. WILBRAND and STAELIN. On the ocular affections of the early stage of syphilis. A monograph. Hamburg, 1897.

322. SIEMERLING and BOEDEKER. Chronic progressive ocular-muscle paralysis and progressive paralysis. *Arch. f. Psychiatrie*, xix., 2–3.

323. LÜBBERS. The ocular changes in disseminate sclerosis. *Ibid.*, 3, p. 768.

324. NAGEL. The importance of ocular examination and particularly of the ophthalmoscopic findings in the diagnosis of multiple sclerosis. *Münch. med. Wochenschr.*, 1897, No. 32.

325. SCHREINER. A case of tumor of the optic thalamus. *Inaug. Dissert.*, Jena, 1897.

326. GROCZ. Pathogenesis and significance of the papillitis coming on with brain tumor. *Wiener med. Presse*, 1897, No. 13.

327. KÜMMEL. Further contributions to the knowledge of the symmetrical affection of the lachrymal and salivary glands. *Mittheil. a. d. Grenzgebieten d. Med. u. Chirurg.*, 1897.

328. GOLDZIEHER. A case of trophoneurosis of the eye after herpes zoster. *Wien. med. Presse*, 1897, No. 8.

329. BRAINE-HARTWELL, C. Double optic neuritis in enteric fever. *Brit. Med. Journ.*, May, 1897, p. 1344.

330. ROCKLIFFE. Cataract extraction and gout. *Trans. Ophth. Soc. Un. K.*, xvi., p. 352.

331. OLIVER. Ocular expressions of gout. *Journ. Amer. Med. Assoc.*, July 31, 1897.

BERGER (315) is of the opinion that many of the ocular disturbances that are referred to diseases of other organs are caused only by the hysteria or neurasthenia accompanying or following these diseases. Cases of neurasthenic functional ocular disturbances in patients convalescent from various diseases are recorded.

v. MÜTTELSTÄDT.

BALLABAN (316) records the case of a woman 48 years of age who suddenly became blind after having suffered for a year with right hemianopsia. Finally vision became $\frac{1}{2}$ in a very small central field. Disturbances were noticed in the power of orientation and in the sensorial sphere.

LANZ (317) records in detail the clinical histories of his cases of cortical and psychic blindness. In both cases the affection came on suddenly as the result of injury, and the chief result in both cases was cortical blindness. The eyes remained normal

and the pupillary reaction to light was present in the beginning, indicating the cortical nature of the blindness. The affection was supposed in both cases to be due to vascular disease, sclerotic or syphilitic. In the case that came to autopsy a bilateral affection of the occipital lobes was found, the cuneus being particularly involved.

In DIMMER'S (318) case there was pressure from tumor or inflammatory exudation in the region of the chiasm, which, through circulating disturbances in the cavernous sinus, produced exophthalmus and stasis in the retina, and, through pressure on the chiasm, disturbances of vision.

STEINER (319) states that in children with Basedow's disease the exophthalmus is wanting in $\frac{1}{8}$th of the cases and that Graefe's and Stellwag's symptoms appear rarely and never combined. Ocular-muscle paralyses are always present, the ophthalmoscopic picture is normal, nystagmus and tremor of the lids are wanting.

HITSCHMANN (320) found in the right eye glaucoma and complete amaurosis; in the left, descending atrophy. He does not believe this condition to have any relation to the acromegaly.

WILBRAND and STAELIN (321) examined the eyes of 200 patients in the early period of syphilis. They found disease of the eyelids in 20 % of the cases, viz., hyperæmia ciliorum, œdema and redness of the lids, blepharitis ciliaris, alopecia, slight ptosis, and the like. Syphilis exerts a direct and an indirect effect upon the organs, the latter consisting, as in the case of all severe injections and constitutional diseases, in a decreased resistance against external injurious agencies.

The conjunctiva was hyperæmic in 17 %, abnormally pale in 5 %. In 10 % there were papules on the mucosa.

The cornea showed unilateral parenchymatous inflammation in one case, the sclera in one case showed bilateral episcleritis. There was iritis in 5 %, complicated with choroiditis in 2 %.

Besides these cases there was choroiditis with retinal hemorrhage and neuro-retinitis in 0.5 %, single patches of choroiditis in 0.5 %. The pupil reacted sluggishly to light in 2.5 % and the two pupils were unequal in size in 6 %.

The optic nerve was affected in 14 % of cases, the affections comprising hyperæmia, neuritis, retrobulbar neuritis, and neuro-retinitis.

There was moderate contraction of the visual field in 36 %, due mostly to the disturbance of the general condition.

This paper of SIEMERLING's (322) forms a continuation of his observations in the insane department of the Charité. Among 900 cases of paralysis there were permanent paralysis of a single ocular muscle or total ophthalmoplegia in only 2 %; transient paralyses were found in 20 %. The second half of this important paper is taken up with the descriptions of single symptoms, and contains many points of note in regard to anatomy and particularly in regard to that of the nuclei of the ocular muscles.

LÜBBERS's (323) paper is a continuation of Uhthoff's well-known monograph, and is an account of the eye changes found in the patients with disseminate sclerosis seen in the Marburg clinic in the years 1889–1894. In the optic nerve the changes are sometimes those of interstitial sclerosis, sometimes those of simple gray degeneration.

The clinical side of the subject is treated extensively.

NAGEL (324) records two cases. In the first, ophthalmoscopic examination revealed a unilateral temporal pallor of the disk with but slight deterioration of vision. The suspicion of multiple sclerosis was verified. In the second, there were temporal pallor of the disks, a marked disproportion between visual disturbance and ophthalmoscopic finding, associated limitation of left lateral movement of the eyes, and incomplete right internal ophthalmoplegia. These symptoms suggested the diagnosis multiple sclerosis.

GROCZ (326) differentiates two forms: the first, due to stasis; the second, to inflammation. The former are brought about by true tumors, the latter by gumma and tubercle. In the former case vision is not affected, in the latter it is soon lost. With cerebellar tumors the papillitis comes on early on account of the obstruction offered to communication of the ventricles by the tentorium and on account of the interference with the blood circulation.

KÜMMEL (327) begins with the report of two cases in which there was swelling of both lachrymal and of all the salivary glands, and adds histories of four other cases in which the lachrymal glands were unaffected while the salivary glands were involved, in various combinations.

The clinical picture is as follows: In an individual usually of middle age, without disturbances of the general condition and without pain, a diffuse enlargement appears in the various cephalic glands of the salivary type.

The glands of both sides are always involved and the disease never passes beyond the limits of the capsule of the gland. The outcome of the disease when not treated is not yet determined, but after extirpation there was recovery in a number of cases.

In speaking of the genesis of the disease a comparison is made with similar affections of two sorts, one group of cases resembling the type of pseudo-leucæmia, malignant lymphoma, or lymphosarcoma, while a second group of cases resemble true leucæmia. The author then gives a description of the microscopic findings in 41 of his cases, in which the chief change lay in the substitution of lymphatic tissue for glandular.

An examination of the blood will differentiate this disease from leucæmia, but a long period of observation is required to distinguish it from pseudo-leucæmia, lymphoma, and lymphosarcoma. The fact of the affection being always bilateral serves to distinguish it from the ordinary primary tumors. The prognosis is favorable. Arsenic, iodide of potassium, and syrup of the iodide of iron should be tried, and if these are of no avail extirpation may be done in case there are functional disturbances or deformity.

GOLDZIEHER (328) found, after recovery from herpes zoster of the upper right side of the face, that there remained injection of the eyeball, patchy parenchymatous opacity of the cornea, hyperæmia of the iris, and contraction of the pupil without synechiæ. Tension was diminished and vision poor.

In HARTWELL'S (329) case, a boy æt. eleven, double optic neuritis was discovered two days before death. The case presented doubtful symptoms pointing to meningitis or typhoid fever; patient died on 18th day. No convulsions, no strabismus, no nasal or aural discharge. Post-mortem there were found, inflammation of Peyer's patches, and enlargement of the mesenteric glands and solitary follicles. Brain normal. WERNER.

ROCKLIFFE'S (330) patient, a man æt. sixty-two, got an attack of vomiting the night of the operation, and a couple of days later an acute attack of gout developed. There were œdema of the lids and chemosis for some days, but cornea was quite clear, and patient made a good recovery. WERNER.

In this short paper OLIVER (331) points out the numerous manifestations of gout in the different tunics of the eye, especially the conjunctiva and sclera, which are usually characterized by excessive pain, and a tendency to be influenced by meteoro-

logical conditions, and by photophobia, sometimes intense. Its manifestation in the uveal tract may be in a slow serous inflammation or in rapid and sharp attacks of the acute forms. In the retina it is marked principally by changes in the vascular walls, maybe with feathery hemorrhages with yellow glistening bodies in the circummacular region. BURNETT.

REPORT OF THE MEETING OF THE OPHTHALMOLOGICAL SOCIETY HELD AT HEIDELBERG, AUGUST, 1897.

By Prof. C. HORSTMANN.

Translated and Supplemented by Abstracts made from the full official report (J. F. Bergmann, Publisher), by Dr. J. A. Spalding, Portland, Maine.

FIRST SESSION, AUGUST 5, 1897.

President, Prof. Haab, Zurich.

1. Dr. Krückmann (Leipzig). On the **Pathogeny of choked disc.**

The author is of the opinion that, with the exception of agents furnished by animal parasites, the material necessary for production of a choked disc must be furnished by the cells of the human body itself. These cells he calls puretogenous, somatogenous, or autogenous, and refers their origin to hypertrophic material, produced by the destruction of cells. He also relies on the form of the exudate, which is chiefly fluid, to explain the disproportion which exists between the slight functional disturbance and the stormy appearances often seen in the papilla itself. The chief causes of choked disc are autonomous tumors, tuberculosis, syphilis, and parasites. The occurrence of papillitis in intracranial processes is favored by anatomical connections of the peripheral terminations of the optic nerve with the central organ ; and by increased cerebral pressure ; it is a papillar inflammation ; the inflammatory matter is somatogenous or autogenous when vision is slightly disturbed, but such an origin of the inflammatory material does not always explain the slight functional disturbance.

Leber remarked that he had offered the same theory some years ago and was glad to see it taken up again. He cannot believe that the intervaginal sheath of the optic nerve is openly connected

with the circumvascular lymph spaces of the nerve trunk. He thinks that the experiments which favor such a view arise from the error of forcing experimental fluid into adjacent blood-vessels. He urges the abandonment of the term choked disc, by substituting "swollen disc" or "papillary swelling."

Krückmann replied that he had invariably found meningitis in all his cases, and referring to the communication-theory, speaks of Elschnig's experiments and a case of his own of leucocytic infiltration from the intravaginal space into the perivascular juice-cell-system of the optic-nerve vessels.

2. Dr. L. HEINE (Marburg). **Accommodative alteration in the position of the lens**, measured objectively and subjectively.

Heine in following up the experiments of Hess establishes the fact that the lens after accommodative relaxation of the zonula has a working space of 0.5 *mm* and after instillation of eserine of 1 *mm*.

The subjective method is based on the observation of apparent movements in threads at different distances from the eyes, the objective on the observation of displacement of the image of the posterior surface of the lens in relation to the corneal image.

3. Dr. HEINE. **Microscopic fixation of the act of accommodation.**

This paper is brief, but shows, with aid of the appended plates, the actual state of affairs in the eyes of pigeons during the act of accommodation.

4. Dr. v. HIPPEL (Heidelberg). **The eyes of new-born infants.**

A long list of experiments shows first the influence of the hardening material on the separate portions of the eye. Müller's fluid, by artificial swelling, alters most noticeably the lens, and less noticeably the cornea. Formol makes good preparations except of the lens, of which it spoils the shape, unless the eyes are opened fresh and then rapidly exposed to its action.

The retinal folds at the ora serrata, described by Lange in the eyes of children, are essentially an artificial product. The cornea shows great variations in thickness in individual cases. The anterior chamber is much deeper than has hitherto been described. The form of the lens, as examination of fresh eyes shows, is essentially different from all previous descriptions, its thickness measuring in two instances as much as 3.76 *mm*, and the posterior surface being much more curved than the anterior.

The ora serrata is distinctly developed, in opposition to former assertions made by Schoen, and there are to be distinguished an ora serrata of the pigment epithelium, and another of the retina itself, which lies farther forward.

The physiological excavation is present in exactly the same condition as later in life, and the fovea centralis is extremely flat and level, the bodies of the cones in the bottom of the fovea being in infancy still poorly developed, and the optic nerve containing no medullary sheaths. Hemorrhages in the retina are frequent, and may be the cause of the congenital amblyopia, or of the so-called macular coloboma.

HESS agrees with the paper in regard to the retinal folds which are certainly artificial, and has himself made excellent specimens of the physiological excavation.

WEISS insists that in making comparisons the material ought always to be hardened in the same sort of fluid. He had never seen any swelling of the cornea produced by immersing the material in Müller's fluid. The anterior chamber in new-born children was not so shallow nor the lens so curved as used to be asserted.

FRÄNKEL cannot understand how, if we explain congenital amblyopia by congenital retinal hemorrhages, such a condition has never been discovered except in one eye.

SATTLER was of the opinion that a mixture of formol and Müller's solution gave excellent preservative and fixing results. Formol alone has curious effects on the lens, causing an appearance like anomaly of development. Sublimate thickens the lens. By adding to the sublimate a little concentrated vinegar, the conditions are well preserved. Although the cornea may be thickened by imbibition of the preserving fluids, there is no alteration in the anterior surface, but a diminution in the depth of the anterior chamber.

A physiological excavation is only gradually developed ; it is less frequent in children than in adults, more often seen in myopia than in hyperopia. In high degrees of hyperopia an excavation is rare.

AXENFELD prefers a mixture of platinum and chromic acid, and especially for very myopic eyes, but the objects ought not to be permitted to remain within the vessel more than thirty-six hours. Although the cornea swells, its curvature remains the same. He would like to inquire if the retinal hemorrhages were fresh, or

already exhibited alterations. He had personally seen abundant retinal hemorrhages in infants a few days old, but they all contained hæmatoidin, which seemed to prove that they did not result during birth, but during intra-uterine life.

BERNHEIMER had seen non-medullated nerve fibres in the orbital portion of the optic nerve in a child four weeks old ; had no development of medullary sheaths until the fourth week of life.

v. HIPPEL could not grant that platinum-chromic acid was useful for examining the lens, because the incorrect form of this structure as shown in various books originated from specimens which had been exposed to this mixture.

5. Dr. HESS (Marburg). On some rare cases of **Glàucoma and the action of the accommodation in primary glaucoma.**

The author first reports the microscopic condition in two curious cases of glaucoma.

In the first, a woman was hit in the eye with a stick of wood, but without perforation of the cornea. Eserine and sclerotomy being of no avail, the eye was enucleated on account of severe pain, in opposition to the views of Priestley Smith, that the increased tension was caused by obliteration of Fontana's space. Hess thinks that in his case the obliteration of this space was not the cause but a result of the increased tension.

The second case was in a young hemophilic boy of eleven who suffered a slight injury to the cornea, which was in turn followed by profuse hemorrhage into the anterior chamber. The cornea gradually became infiltrated, and increased tension set in, necessitating enucleation on the tenth day after the injury. Both chambers were filled with blood, coagula in the anterior portion of the vitreous chamber, well defined excavation despite the brief duration of the affection, lens intact and *in situ*, but the iris pressed flat against the posterior surface of the cornea, and representing only a delicate strip of tissue.

The writer discussed the alleged prejudicial action of the accommodation in primary glaucoma, and Snellen's theory concerning the same, which did not seem to be in unison with facts discovered by Hess regarding the act of accommodation. In the author's opinion we ought on the contrary to expect a favorable action of accommodation upon the glaucomatous process. He emphasized the contradiction between avoiding every act of accommodation as an important agent in the prophylaxis of glau-

coma, and yet regarding the production of forcible and prolonged spasm of the ciliary muscle by instillations of eserine as the most active remedy for incipient glaucoma.

SATTLER in the discussion expressed the opinion that the accommodation had nothing whatever to do with glaucoma. He reported a case of glaucoma which he had held in check for years by the use of pilocarpine. The patient in the occasional absence of the remedy had observed that he could stop the attack by reading steadily with glasses appropriately fitted to his presbyopia. The patient asked if he could continue reading under these conditions, and having Sattler's consent was able at later dates to confirm his previous experience. Sattler had heard of similar cases, and thought that if patients were not so absolutely prohibited from using their eyes during the prodromi of glaucoma we should oftener hear of these interesting cases, which were well worth studying from the point of view of the influence of the accommodation upon the disease.

6. Dr. SATTLER (Leipzig). **On the elastic fibres in the lamina cribrosa and optic nerve.**

Following out the line of thought of a previous essay on the same topic, Sattler repeats that where the optic nerve passes through the sclera the latter exhibits an unusual course and arrangement of the elastic fibres. The margin of the scleral aperture contains exclusively circular fibres, of which a very large number radiate outward into the framework of the lamina cribrosa, and collectively pass along in the plane of the scleral aperture. Around the central vessels is placed a sheath extremely rich in elastic fibres, and being in intimate connection with the trabecles of the lamina. No elastic fibres run in the direction of the optic-nerve fibre-bundles.

7. Dr. LEBER (Heidelberg). **On ribbon-shaped opacities of the cornea.**

LEBER examined anatomically a large number of eyes affected with ribbon-shaped keratitis. There are two forms: a primary, and a secondary entirely different from the other. The first form affects the eyes of elderly persons, and such eyes are disposed to become glaucomatous. The second form is found in eyes with chronic inflammation of the uveal tract There is, however, histologically no difference between the two forms. The calcareous deposit limits itself at first to Bowman's membrane, but later it extends to the parenchyma and to the epithelium of the cornea.

Bowman's membrane gradually thickens, assumes a stratified appearance, and exhibits protuberances which show a structure analogous to that of verrucosities (Drusen). The posterior surface also shows scattered deposits and corrosions. The excrescences originate beneath the epithelium, which at a later date disappears. Moreover, the anterior surface of Bowman's membrane exhibits connective-tissue neoplastic formations in which we can at a later date discover remnants of the membrane. One of the consequences of this occurrence is that the fractured ends of the membrane are dislocated over one another. Clumps of hyaline substance are also seen in the cornea, calcified and with plates of chalk. External influences cause deposits of carbonate and phosphate of chalk, on account of which the opacities are chiefly found between the opening of the eyelids. The arcus senilis depends on the same cause.

SATTLER emphasizes the anatomical differences between Bowman's membrane and that of Descemet. In morbid conditions we should not forget the canals in Bowman's membrane made by numerous fine nerve fibres perforating it to enter the corneal epithelium.

VOSSIUS once saw a case of apparent calcareous concretions in the cornea, but the disease was not chalky at all. From a single case like this one might conclude that formation of chalk was not always the primary occurrence in ribbon-shaped keratitis.

LEBER remarked, that wherever chalky concretions had not been found in ribbon-shaped keratitis as in a solitary case, the minute chalky granules had been dissolved out of the specimen by the action of Müller's fluid previous to the microscopic examination.

8. Dr. MAYWEG (Hagen). **A case of sarcoma of the iris.** This was a report of a case of sarcoma of the iris, the only one that the writer had seen in the course of thirty years in ophthalmology. The patient had observed the spot in the iris some twenty years before it began to increase noticeably in size and to cause a sensation of annoyance in the eye. The operation for extirpation by iridectomy was followed by so profuse a hemorrhage that only a portion was removed. A week later, after resorption of blood in the anterior chamber, a longer flap was made, turned over, a bit of iris excised on each side of the tumor, and then the whole torn away to the insertion of the iris. There had been no relapse in four weeks.

Dr. KRÜCKMANN insisted that the name "nævus" of the iris is not applicable to tumors of this nature.

When a tumor develops from a pigmented segment of iris it must be carefully watched. If it grows slowly and remains circumscribed, it is probably a fibroma. If it increases in size not only anteriorly but laterally, enucleation is necessary, on account of the danger of metastasis. Total enucleation is indispensable because the tumor often extends farther backward than we can perceive with instruments at our command.

MAYWEG does not mean to identify nævus of the skin and nævus of the iris with one another, but rather to suggest that pigment spots of the iris and of the skin bear relation to one another in the way in which they develop into malignant tumors.

HAAB once removed a leuco-sarcoma of the iris by making an iridectomy on both sides of it and then shelling it out. There was no relapse. Tilting the flap with a fine hook is advisable in cases of foreign bodies (not of iron) lying in the furrow between the iris and cornea. If we merely insert a knife the aqueous escapes and the foreign body is more deeply imbedded. But if we make a broad peripheral flap, we gain free access after tilting the flap and can hold the iris back with a spatula so that it does not fall down over the intruder.

AFTERNOON SESSION, AUGUST 5TH.

President, Prof. WAGENMANN, Jena.

1. Dr. BACH (Würzburg) showed sketches and specimens of orbital cysts, typical and atypical colobomata of the iris and lens, coloboma of the zonule of Zinn, persistent hyaloid artery, lenticonus posterior, and microphthalmos.

2. Dr. AXENFELD (Breslau). (*a*) On the **Tubercular histology of sympathetic ophthalmitis.** The writer urges anew the occurrence of epithelioid and giant cells in eyes suffering from uveitis which has caused sympathetic ophthalmia. He shows specimens in which these have arranged themselves into typical tubercles. They had not become caseous, nor were bacilli present. In spite of the histological resemblance to tuberculosis the author does not think that the latter disease was present, for if so we should find tuberculosis oftener in cases of sympathetic ophthalmia. In order to decide the question more scientifically he recommends the transplantation, from freshly enucleated eyes, of portions of the choroid into the peritoneum of the guinea-pig.

(*b*) **Tubercular structures in gummous syphilis.** A man of forty suffered from a dense infiltration and ulcerated surface in the right upper eyelid, simultaneously with extensive ulcerations in the mouth, pharynx, and larynx. A test excision from the lid showed granulation tissue which pathologically seemed to be of a tuberculous nature. But as the dermatologists thought the pharyngeal symptoms were syphilitic, an antisyphilitic treatment was adopted, with the result of healing the ulcer, whilst for a long time before silver nitrate and ointments had been of no use. So far as the influence of treatment proves anything, it shows that gummous alterations may produce structures resembling tubercles, as has often been urged by dermatologists. The differential diagnosis so far rests alone on the histological conditions.

3. Dr. HEINE demonstrated the apparatus for measuring the accommodation in the pigeon's eyes mentioned in his paper on that topic.

4. Dr. HIPPEL : **Specimens of children's eyes.**

5. Dr. BAAS : **Hyaline bodies of the lens.**

6. Dr. BIESCHOWSKY : **An apparatus for measuring the visual angle.**

7, 8, 9, 10. Drs. SATTLER, LEBER, HESS, and MAYWEG exhibited the specimens belonging to their papers.

11. Dr. WEISS exhibited two cases of **Cicatricial ectropium,** both of which were interesting in many points of view.

The first case was that of a scrofulous child in which, owing to an osseous cicatrix in the lower and outer margin of the orbit, an extensive ectropium of the lower lid was produced.

This condition was removed by the following operation : The bony scar was first extensively loosened, and then by tarsorrhaphy the lower lid elevated. After this was completed, the pocket of skin which had arisen at the region of the loosened cicatrix was filled in with fatty tissue taken from the patient's leg. Inasmuch as the chief incision now gaped and suturing would have been followed by renewal of the ectropium, the skin of the lids was laid over the cushion of fat, thus holding in its place like a sort of cover the mass of fatty tissue. In order to prevent misplacement, a network of threads was placed transversely across this, but not through it. The final result was good despite the unfavorable nutritive conditions under which the patient remained. The case had been shown a year before at another meeting and doubts were then expressed concerning the permanence of the result, but now, nearly two years from the operation, the result may be claimed as permanently good.

The second case was especially interesting, because after a similar operation another tissue had healed in beneath the skin. It was seen that the fatty tissue which had healed in beneath the skin in the first case shrivelled more and more so that at the spot of the originally abundant pillow of fat only a mere trace of tissue could be felt. The healing in of muscular tissue instead of fatty might be more suitable. But muscular tissue is not easy to get for such purposes and therefore the under healing of skin was attempted. After large pieces of human skin had healed in under the skin of rabbits during which the underhealed flap decreased more and more in size, and after such skin flaps had remained healed in beneath the skin of these verification animals for more than a year, skin from the thigh of the same patient was used as a filling material after loosening the bony cicatrix. The flap healed nicely, though gradually diminishing more and more in size, and it can now be felt as a small nodule between the skin and the bony wall.

Dr. v. HOFFMAN remarked that in fresh cases of ectropium in scrofulous children it was a good plan to freshen the edges of the lids, then to sew them together for a long time, and to cure the caries by drainage. Finally the eyelids are reopened.

12. Dr. NEUSTATTER showed a new **Skiascope.**

SESSION, AUGUST 6TH.

President, Dr. HESS, Marburg.

1. Dr. BACH (Würzburg). On the **Theory of paralysis of the ocular muscles.**

BACH describes the results of his experimental investigations by means of Nissl's method of primary irritation. His idea was to determine the ganglionic cells for the separate eye muscle nerves, and chiefly to furnish a contribution to localization in the region of the oculo-motor ganglion. The experiments were made on rabbits, cats, and an ape.

(1). If we divide an external eye muscle, certain regular alterations take place in the ganglionic cells of the nucleus several days after the division of the muscle nerve.

Amongst those alterations (which are not to be found in animals that have not been operated upon) are those which Nissl saw in the facial ganglion after removal of this nerve, and which the author saw in the ganglionic cells of the retina, after its detach-

ment. That is to say, the colorable substance of the cells becomes finely granular, the cell looks as if covered with dust, the colorable substance, as well as the nucleus, crowds toward the margin of the cell, the central cellular portions grow hyaline and homogeneous in appearance, the colorable matter disappears from the offshoots of the protoplasm, and finally the entire cell shrivels, loses its offshoots, and looks glassy and colloid.

(2). These alterations are not equally pronounced in all the cells, but they are generally well defined in most of them on the tenth day, whilst slighter alterations may be detected a little sooner.

(3). The muscle should not be torn out, but completely divided and the peripheral portion extirpated: especially is this the case with muscles nourished by the oculo-motor nerve.

(4). The brain should be put into the preservation fluid in an absolutely fresh condition, because soon after death alterations occur in the ganglionic cells.

(5). If we exenterate an entire orbit we observe alterations in the oculo-motor and trochlearis regions on both sides. The oculo-motor alterations are more marked on the side that has been exenterated than on the other. In front of this, they are limited more and more to the same side. The trochlearis alterations are more pronounced on the opposite side. Abducens alterations are found only on the same side.

(6). Division of the inferior rectus produces oculo-motor alterations on the same side, more than half the cells at the proximal (anterior) end being altered. Twenty-five sections farther on degenerated cells are scarcer.

(7). Division of the rectus internus produces alterations in the proximal sections on the same side, but not sharply defined from those belonging to the inferior rectus. Farther backward and downward we see a few degenerated cells. The number of degenerated cells in the oculo-motor ganglion observed after division of this muscle is small in comparison with other muscles.

(8). Division of the inferior oblique gives alteration in front of the trochlearis nucleus. Sections in the posterior portion of the oculo-motor ganglion show altered cells beneath; in the middle of the ganglion, centrally; and in front, above.

(9). Division of the rectus superior shows alterations mostly on the opposite side, beginning in front of the trochlearis ganglion.

(10). If we remove the iris and ciliary body, no alterations are

seen in the oculo-motor tract, but there are alterations in the ciliary ganglion on the same side.

(11). Division of the superior oblique shows bilateral alterations in the trochlearis ganglion, more extensive on the opposite side.

(12). Division of the external rectus (posteriorly) shows alterations on the same side.

(13). Division of the rectus internus (anteriorly) showed no alterations in the abducens ganglion, and equally negative were the conditions in the oculo-motor ganglion after division of the external rectus.

(14). No proof was discovered of the origin of the ocular branch of the facialis in the oculo-motor ganglion.

No ganglionic cells could be discovered for the levator or retractor of the globe. The ganglionic cells appertaining to the superior palpebral muscle lie in the distal nuclear region, whilst those of the ciliary ganglion which act on the cells of the ciliary nerves lie in the anterior sections on the ganglion.

My experiments show partial crossing of the oculo-motor nerve, chiefly in the distal sections ; it is incorrectly stated by others that the trochlearis nerve completely crosses.

There is no definite separation in the oculo-motor tract between the different cells appertaining to the various ocular muscles.

For the past nineteen years all cases of ocular paralysis in the Würzburg clinic have been carefully investigated from the standpoint of nuclear pathogeny, and if the conditions in man are anything like those in animals, it is difficult to reconcile clinical diagnosis of nuclear paralysis with experimental investigations as shown in this paper. We cannot help feeling that many cases asserted to be nuclear were not so at all.

BACH, in experimenting upon the centres and the paths of reflex pupillary movement, mentions the observation of direct and indirect pupillary reaction after decapitation.

The author urges a fundamental revision of the theory of paralysis of the ocular muscle.

2. Dr. ST. BERNHEIMER (Vienna). **Experimental studies towards a better knowledge of the innervation of the extrinsic and intrinsic eye muscles supplied by the oculo-motor nerve.**

This paper gives the results of experiments on apes in connection with embryological and anatomical investigations of the

radical regions of the oculo-motor nerve in man. The examination of 1200 serial sections showed that the centres for the superior, internal, and inferior recti, and for the inferior oblique lie in the lateral cells of the lateral principal ganglion as first described by himself. In the distal lowermost fifth of the ganglonic region they lie exclusively in the opposite lateral principal ganglion, and in the lateral cells of the same in the following fifth, but in both of these fifths they lie at first more in the opposite side, then gradually crossing to the same side. In the third and fourth fifths they lie exclusively on the same side. Finally, in the last and anterior fifth they lie in the most ventral portion of the principal ganglion on the same side.

The secondary ganglia in and about the median line in the proximal halves of the oculo-motor centre, the conjugate small-celled, and the solitary large-celled median ganglia are genuine oculo-motor ganglia, and must be regarded as centres for the intrinsic muscles of the eye (accommodative and sphincter muscles) supplied by the oculo-motor nerve.

The small-celled median ganglion of the right side belongs to the right eye; the large-celled solitary median ganglion supplies both eyes, but the cells supplying the right eye lie to the right, and those for the left eye to the left. The separate groups of cells are not sharply defined from one another.

The root for the rectus inferior of the left eye lies in the distal portion of the right lateral principal ganglion close to the trochlearis and in the corresponding lateral cells.

Next we find the cells for the inferior oblique of the left eye springing from the thicker portion of the ganglion.

Further on lie the cells for the rectus internus of the right eye, and fibres from the broad dorso lateral portion and the lateral cells pass (crossed) to the internal rectus of the left eye.

Adjoining these we have the ganglion for the superior rectus of the right eye on the same side. The proximal portion of the right lateral principal ganglion is formed by cells, belonging to the levator of the right eye. The so-called upper ganglion of Darkschewitsch does not belong to the oculo-motor. The topographical relations of the ganglionic region of the oculo-motor nerve in apes are precisely like those in man.

(The two figures in the official report make this complicated description very plain.—Translator.)

4. Dr. Bielschoswky (Leipzig). **On monocular diplopia without physical cause.**

A very intelligent patient of eighteen years whose previously normal right eye was enucleated for a serious injury, soon began to complain of double images in the left eye. This eye was amblyopic, and at one time squinted inward. A long series of careful investigations positively excluded any simulation. Inasmuch as the most accurate investigation of the eye with the binocular lens, ophthalmoscope, stenopæic apparatus (under mydriasis), and Nikol's prisms failed to show any anomaly which might excite the diplopia, and, farther, since the visual fields of the left eye were twisted at a small angle to one another, and, finally, as there was confusion and mingling of colors when with one of the images of a fixed object another of a different color was brought up to cover it, he was forced to conclude that the two objects on the retina were not due to a physical condition. On the contrary the retina received but one image of one object, but the simple excitation was simultaneously located on two different spots in space.

The only explanation of this phenomenon, which originated undoubtedly in the strabismus of the left eye, rests on Hering's theory of the identity of the retinæ, and the visual axes. During the time when the patient squinted, the need of binocular single vision in a larger central region developed a new identity the values of space and of the axes of vision. The congenital value of space held in the background during this time comes into consideration with the loss of the associated right eye. The monocular diplopia now becomes the expression of the double values of space. One image of an object corresponds in its situation to the congenital, the other to the acquired value of space of the retinal regions concerned. Therefore, of the two visual fields in the left eye, the acquired one is identical with the lost one of the right eye, and, if we consider the phenomenon of the confusion of the fields and the mingling of colors, we must assume new central associations, a single irritation producing the same symptoms in one retina as the simultaneous irritation of identical regions in both retinæ did before the accident.

5. Dr. Weiss. **On the condition of the visual field in patients with squint.**

After observing several patients with squint who offered remarkable anomalies of vision, the author undertook a large series of examinations of the field of vision, in the hope of obtaining some idea of inexplicable relations in the visual field of patients

similarly affected. Out of one hundred and thirty-seven cases thus investigated, twenty-five with divergent, twelve with articifial, and one hundred and four with convergent squint, he found a remarkable condition in twenty-eight.

Weiss does not think it advisable from these cases to calculate the percentage of the frequency of anomalies in the visual field of squinters, as in his list the percentage would probably be greater than the average, because his material was not uniformly selected; for in the first years of his investigations he only took exceptional cases—those in which a superficial test with the hand gave rise to suspicion of anomaly in the fields.

The results of Weiss's measurements showed concentric limitation of the field in eight cases, nasal limitation in eight, temporal, in three, and a central scotoma in nine. Arranging these by the variety of squint, we find in divergent squint one case of concentric limitation, one of nasal, and two of scotoma.

In artificial divergent squint, one case of scotoma, and one of nasal contraction.

In convergent squint, seven cases of concentric limitation, seven of nasal, three of temporal, and finally five of central scotoma.

Weiss concludes from these conditions that anomalies of the field in squinters are not rare, but they do not favor the theory of amblyopia ex anopsia. If it were correct that the squinting eye grows weak-sighted from non-use, we ought in unilateral convergent squint (especially when the case is of long standing) to expect a loss of perception in the nasal half of the field, but such is not the case.

Curious conditions were discovered on testing the field with colored lenses. Even when the central vision of the squinting eye was much diminished, the visual impressions of the squinting eye dominated on one side, and in so doing it was easy to find a spot in the fixing eye in which the retinal impression of the squinting eye predominated. This spot corresponded to the macula of the squinting eye.

In the discussion V. HIPPEL remarked that the field of squinting eyes had before been measured with colors by Hirschberger, and the discovery made of a spot in the fixing eye corresponding with the macula of the squinting. From this fact, Hirschberger explains the absence of diplopia in squint.

Weiss called attention to the fact that Guillery found fault with

Hirschberger's tests, because the use of colors produced abnormal conditions.

SACHS said that Alfred Græfe had called attention to the same spot in the fixing eye, many years before.

BIELSCHOWSKY, referring to his previous paper on diplopia, on which no remarks were made, recalled a case of triplopia described by Classen, occuring after tenotomy, when the still slightly squinting eye fixed. Classen made no attempt to account for the phenomenon, but in Bielschowsky's opinion it could only be explained by reasoning similar to that in his paper on diplopia.

6. DARIER (Paris). **Operation for ptosis by autoplasty or muscular graft.**

Darier excises from the skin of the upper lid, close to its margin, a horizontal, oval flap as long as the lid, so that the muscle is exposed. Then he makes an incision of the same length beneath the eyebrow. Next he undermines the bridge of skin between the two incisions and loosens the exposed muscle from its attachment, but leaves standing at both sides its connection with the rest of the orbicularis. The loosened piece of muscle is then divided so that two tongue-shaped muscular pieces remain standing at both sides. These pieces are now passed beneath the undermined bridge of skin, and sutured into the incision beneath the eyebrow. In this way the orbicularis undertakes the functions of the levator palpebrarum.

NÖRING praises the operation devised by Hess, but thinks that the error in all operations for ptosis consists in removing the sutures too soon.

SCHIRMER inquired concerning the innervation of the transplanted bundle of muscular fibres. Would not the lid, in point of fact, be raised whenever the patient wished to close the eye?

WOLFF thought that in all these operations too much attention had been paid to the elevation of the lid, but none at all to its closure. He urged greater attention, from this point of view, to the levator muscle, through the advancement of which we not only obtain excellent elevation of the lids but, additionally, a natural closure. Furthermore, deformities are thus avoided.

HESS had never seen any difficulty in closing the eyes after operations for ptosis, and thought the objections were more theoretical than practical.

Nöring: "The lids never remain open, and if occasionally in sleep they do not accurately close, the patients soon learn, as in

lagophthalmos to roll their eyes upward so that the cornea is absolutely protected."

Hess inquired if in winking, instead of closing the eye as intended, it would not fly open.

SCHÖNEMAN had operated on at least thirty cases by Hess's method, and was pleased with the results. He had observed patients when asleep and found a slight fissure between the lids, but the cornea was invariably covered.

In conclusion, Darier remarked that he had occasionally, after several months, observed under the influence of the will an enlarged opening between the lids. This he could not explain, but he knew that the patients could open the eye when they wished and that it did not close against their will. In his opinion the lids closed perfectly, and the cosmetic results were excellent, no cicatrix remaining.

7. Dr. KARL BAAS (Freiburg): **On the anatomical basis of ring scotoma, with some contributions to our knowledge of syphilitic alterations in the eye.**

After calling attention to the literature, Baas passed to an account of the anatomical examination of an eye affected with chorio retinitis syphilitica which during life exhibited a well-defined and characteristic ring scotoma. The author found a pustular-like degeneration of the external retinal layers, the inner remaining intact. Later, he describes the results of his investigations in syphilitic eyes, which with predominating disease in the choroid exhibits under the microscope well-marked inflammation of the arteries. The inflammatory conditions in the choroid are regarded as secondary syphilis, despite the fact of the long interval existing since the constitutional infection. The ciliary vascular system also plays a great role in syphilitic inflammation of the optic nerve.

LEBER said that ring scotoma may also be attributed to the optic nerve. The proof so far lies in clinical facts, no anatomical demonstration having yet been offered.

VOSSIUS saw unilateral ring scotoma in a young lady suffering from arthritis. The loss of sight was sudden and total, but it gradually returned. An inunction cure relieved the inflammatory symptoms in the nerve, but the appearances some months later, with a permanent ring scotoma, were like those observed after retrobulbar neuritis.

WEISS called attention to the occurrence of definite ring scoto-

mata for colors in highly myopic patients. As preliminary to a paper based on field measurements of several hundred cases of high myopia, Weiss emphasized the enlargement of the blind spot and round about it a zone insensible to colors. He has also seen the same in myopia of low degree, and occasional loss of the field for white or for colors.

WAGENMANN reported a case of ring scotoma in a patient with retinitis pigmentosa, in which there were pigment alterations visible with the ophthalmoscope in the region corresponding with the ring scotoma, whilst for some distance inside and outside of this pigmented region there was no trace of pigment. This confirms Leber's view of an affection, in ring scotoma, of the external layers of the retina, the conducting layers remaining intact.

SATTLER spoke of the fact that Otto had exhibited at a previous Congress defective fields in myopic persons.

Baas grants the possibility of ring scotoma from optic neuritis, but thinks it is not permanent.

Weiss remarked that in Otto's paper no mention had been made of actual measurements of the field in high myopia, and claimed that even if such were exhibited in 1896, he had called attention to the same subject two years before that.

Sattler replied to the editor of the official report that Otto was present with visual field charts in 1896, but the subject did not come up for discussion owing to some misunderstanding. Otto's paper was printed in *v. Graefe's Archiv*, Band xliii., Abth. 3, May, 1896, and it is interesting to find two observers making identical and interesting and simultaneous discoveries concerning myopia of high degree.

Weiss (by permission of the Editors) finally calls attention to the fact that Otto acknowledges that he was incited to his investigations by suggestions from Weiss, so that the question of priority is satisfactorily established in favor of the latter.

8. Dr. VOSSIUS. On **Intermittent exophthalmus.**

The paper mentions twenty cases, two of which were personally observed. One eye only is attacked, and generally in young persons with normal vascular system. A few cases were preceded by what might be called slight blows in the orbital region. When the head is held forward the affected eye suddenly protrudes, and slowly returns to place when the sufferer stands erect. Permanent loss of sight is not observed. The exophthalmus occurs even when standing erect, provided that the jugular on the same

side is compressed. We generally find varices in the lower extremities, and varicose tumors about the globe. v. Graefe once saw a vein-stone in a varix of the orbit. The disease is due to varicose enlargement of the orbital veins, or weakness of the venous walls.

Enophthalmus was previously observed in 11 cases. Only 6 revealed varicosities in the orbit. It was observed 11 times in the right eye, and 9 in the left. It occurred in 14 men and in 6 women.

NEUSTATTER saw a case in the right eye become permanent after typhus. Previously it had intermitted only at the time of the menses, for over four years.

AXENFELD had lately seen and will soon publish a case of alternating en- and ex-ophthalmus, with simultaneous paralysis of the oculo-motor, and atrophy of the optic nerve.

VOSSIUS: With the exception of cases by Meyer and Leber, he had never heard of permanent disturbances of sight produced by this disease.

SESSION AUGUST 7TH.

President, Prof. Dr. GULLSTRANDT (Upsala).

1. Dr. SCHIRMER. On the **Function of the so-called parareticular or amakrine cells of the retina.**

Schirmer has investigated the width and reaction of the pupil in diseases of the choroid, retina, and optic nerve. The results obtained in optic atrophy and optic-nerve inflammation further the idea of centripetal fibres in the optic nerve, the existence of which was shown by Gudden in 1883. Pupillary disturbances in retinal affections were only observed in lesions of the internal layers. If the disease was exclusively situated in the outer layers, the size and reaction of the pupil remained intact, even with high degrees of amblyopia. These observations seem to prove that the pupillary reflex does not begin in the rods and cones, but in the innermost retinal layers, and that the parareticular or amakrine cell-elements, concerning whose physiological function nothing was yet known, represents the beginning of this function.

BACH had seen an ascending process in an amakrine cell, but was opposed to the view that offshoots pass directly from these to the optic nerve.

Schirmer urged that ascending processes had never yet been

positively seen, but that direct prolongation of them into the optic nerve had been observed. Experiments with artificially detached retinæ ought not to weigh in similar experiments with diseased detached retina in man.

2. Dr. Wagenmann. **Circulatory disturbances in the retinal vessels.**

Unilateral hemorrhagic retinitis may depend on thrombi of the central veins, emboli or thrombi of multiple arteries, and extensive inflammatory diseases of the vascular walls. So, too, in cases of anatomical demonstration of partial thrombus, alterations in the arteries are more pronounced, the thrombosis being secondary. The author anatomically examined a case in which in three arteries there was an aneurysmal ectasia with extensive endoarteritis. He also communicates a case of unilateral transitory blindness (later permanent) in which he witnessed extreme ischæmia. The circulatory disturbance is, therefore, a local spasmodic ischæmia terminating in arterial thrombosis from arterio-sclerosis. Wagenmann further points out the significance of local vascular alterations, the origin of circulatory disturbances, and asserts that cases diagnosticated as embolism are really cases of thrombosis from arterio-sclerosis. He adds an analogous case in which syphilitic arterio-sclerosis and choroiditis demonstrated local vascular alterations and their sequelæ rather than embolism.

Haab was of the opinion that local vascular alteration played a more prominent role in the production of emboli than had previously been supposed, and that the question of emboli ought to be studied afresh.

Gradle reported a case of apparent embolism in the only eye of a patient. In his opinion this could only have originated from diseased vessels.

Leber wants investigations made in regard to vascular spasm or alterations in cases of permanent blindness, where there was no anatomical proof of embolus. He thought that, even with no thrombus, blindness might remain permanent if the vascular spasm persisted long enough to cause irreparable alterations in the retina.

Wagenmann had seen a case of spasmodic contraction of the vessels in which blindness lasted ten minutes; the circulation being restored, vision returned. It is difficult to diagnosticate, even anatomically, whether the obstruction in the retinal vessels in any given case depends on thrombus, embolus, or the products

of inflammation. The causes of inflammatory loss of sight are numerous; possibly if the vessels are reduced in calibre by age or disease, a sudden weakness of the heart may lead to blindness.

3. HAAB. **Sympathetic chorio-retinitis.**

The writer saw four cases of chorioidal disease in the æquator of sympathetically affected eyes in the form of white circular and partly pigmented spots in the choroid. The affection may be more prevalent than we are aware of, its diagnosis depending, of course, on the transparency of the vitreous. Later the disease spreads to the macula. The spots remain for a long time, and vary from syphilitic patches in being precisely circular. They were not seen until after four months of the sympathetic affection. The field was generally contracted. The affection is not limited to the choroid, but invades the retina.

EVERSBUSCH recalls a similar case, reported in 1882; under careful treatment the patches disappeared in three months.

V. HIPPEL observed an apparent total detachment of the retina in a sympathetically affected eye. Under energetic inunction and resorbent treatment, the vision was restored, and as the vitreous cleared, the retina exhibited circular spots like those mentioned by Haab. Hippel thought that the enormous swelling of the retina produced the appearance of a detachment.

SCHIRMER saw five cases of sympathetic neuro-retinitis which gradually recovered. The retina exhibited similar spots. The recovery after enucleation of the injured eye proved that this form of sympathy depends not on the migration of bacteria, but of products of metabolism.

4. HAAB. On a **Peculiar kind of pseudo-tumor of the eye.**

A patient suffering from a tumor in the left lachrymal sac and its neighborhood seemed to have, also, an intraocular tumor on the nasal side, in structure resembling a sarcoma. The lachrymal tumor was removed and the eye enucleated. The apparent tumor proved to be a reëntrant bulging of the eye tunics by pressure from the tumor. Later he saw a similar case, and, taught by his error, saved the eye with good vision.

WAGENMANN has seen incurvations and alterations in the shape of the sclera in cases of extrabulbar tumors, generally malignant.

5. Dr. STÖLTING (Hanover), on **Increased intracranial and intraocular pressure.** The author endeavors to prove from analogy with conditions inside the brain, that increased pressure

within the eye is due to inflammation of the choroid, and alteration of the lymph thereby excited, leading finally to permanent alterations in the anterior lymph spaces.

6. Dr. AXENFELD. What is the actual state of our knowledge of the origin of the so-called **Scrofulous, or eczematous, inflammations of the eye ?**

The old, well-worn, but variously answered, question, how far typical phlyctenular conjunctivitis occurs associated with scrofula, needs new statistical arrangement. We all agree that the disease of the eye depends on internal and external influences, but how far the one or the other predominates is undecided still. The writer is rather inclined to believe in the prevalence of the scrofulous diathesis, but admits other causes. He examined many patients to discover external causation, and discovered various irritative conditions. It is doubtful if phlyctenular conjunctivitis can depend on purely endogenous causes. The external causes are mostly bacterial, either from the lids, or inflammation of the glands produced by staphylococci and transmitted to the conjunctiva, the cocci not necessarily migrating locally. Or there may be direct infection of the conjunctiva, as in facial eczema of impetiginous origin. A conjunctiva scrofulously affected may reply to such infection in the form of of a phlyctenula. Nevertheless, cases due to bacteria make up only a small proportion of phlyctenular inflammations. A phlyctenula cannot be regarded as a pustule inoculated by staphylococcus. Its origin is still obscure, like other phlyctenular eruptions, such as pannus and keratitis fasciculosa.

The title "eczematous" is undesirable for many reasons; chiefly, because a phlyctenula of the conjunctiva does not correspond to the eczema of the dermatologists.

The author closes his paper by expressing his regret that he has failed to bring positive knowledge to light, but is sure that we shall never make any advances unless we sharply differentiate facts from hypotheses.

In the discussion, LEBER remarked that his researches had led him to nothing positive in regard to the actual scrofulous ætiology of phlyctenula. He does not think that tuberculosis is always connected with certain scrofulous affections. In his opinion, the pustular disease of the conjunctiva is identical with the same disease of the skin. He had lately examined two phlyctenulæ which were not pustular, but positively nodular. He insisted on

the occurrence of conjunctival phlyctenulæ, not on the corneal margin, but in the retrotarsal fold.

BACH examined 32 cases of phlyctenulæ, and found bacteria in 10, doubtful in 12, and positively absent in 10.

SATTLER insisted that there could be no such name as phlyctenula, meaning a blister, or pustule, because every so-called phlyctenula was a distinct nodule, a solid efflorescence. An eczema is a nodule ; eczema is multiple, as are also phlyctenulæ. Arlt long ago insisted on the same title, eczema of the conjunctiva.

LEBER remarked that so long as the dermatologists were not agreed upon a name for scrofulous exanthemata, some calling it eczema and some impetigo, oculists should retain the old-fashioned name of phlyctenula.

HAAB suggested the name of conjunctivitis pustulosa, on the ground of anatomical demonstration.

WAGENMANN thought that there could be no tubercular infection in this disease, as he had inoculated eyes so affected with tuberculin and never obtained a local reaction. He preferred the old name, phlyctenular conjunctivitis ; to call it scrofulous inflammation of the eye was going too far, for there is no proof that it occurs solely in the scrofulous. A phlyctenula is always a nodule infiltrated with leucocytes which penetrate the epithelium.

7. v. HIPPEL (Heidelberg), on **Congenital hydrophthalmus.** This paper was based on the anatomical examination of both eyes of a child dying at the age of eighteen days. The disease was observed at birth, and there was an extensive ulceration of the cornea leading to secondary iritis and cyclitis, with alterations in the ligamentum pectinatum and increased tension. Despite general enlargement of the coats of the eye, there was no abnormity except in the anterior segment of the globe. The choroid and vitreous were probably normal at first, but were affected later.

STÖLTING expressed the opinion that this affection was always due to inflammatory alteration. They were, however, serous in nature, and so delicate that they escaped observation. He had known of eyes with iritis, of which, at a later date, no anatomical trace could be discovered, and so, too, with choroiditis, the latter, for instance, leaving no traces behind except in the innermost retinal layers.

v. Hippel remarked that we should be on our guard lest we disregard the action of hardening materials, or the coagulation of

the blood in the choroid ; or, secondarily, to suppose from the thickened condition of the choroid that the retina might be involved. In his case the retina was intact.

8. Dr. SATTLER (Leipzig), on **The operative treatment of congenital ectopia lentis.** After a brief literary abstract, the author refers to 5 cases of this disease in individuals belonging to two families ; 4 of these submitted to the operation. In a woman of forty-seven an iridectomy inward and downward was made and in the 3 others (all children), discission of the lens. Repetitions were needed in all of these, but the result was good.

EVERSBUSCH always attempts a small sphincterectomy, provided that artificial mydriasis seems to show a useful amount of vision. The amount of iris excised must be small. If the mydriasis test does not hold out hope for sphincterectomy he discinds the lens, not as of old with a discission needle from the corneo-scleral margin, but with a 3 *mm* incision in the cornea, from which he makes an incision into the anterior capsule with a sharp capsulotome. The resorption of the lens takes place under the ordinary precautions observed after operations on soft congenital or traumatic cataracts.

With incomplete dislocation of the lens toward the anterior chamber, the lens "riding" in the field of the pupil he had been unsuccessful in bringing it into the anterior chamber by mydriasis and myosis and then extracting it, because the lens, as the pupil contracted, gradually withdrew behind the iris. He had often succeeded in removing the lens when once behind the iris in the way suggested by Knapp, for lenses dislocated into the vitreous.

GRUNERT had seen several successful extractions of such lenses in the capsule.

Sattler is very careful in discissions not to wound the vitreous.

9. LEBER, on **The combination of intraocular tumors with phthisis bulbi.** He first calls attention to the occurrence of phthisis of the globe as symptomatic of the formation of the tumor within the eye, and regards the original affection as started in the choroid, and so producing phthisis of the globe before the tumor causes much trouble. He would like to know whether the previous phthisis does not predispose the eye to the formation of tumors. He had examined 51 cases of this association of affairs, and still awaited an exact decision whether the tumor arose in a phthisical eye or whether choroiditis excited the phthisis and thereupon the tumor originated.

10. LEBER, on **The treatment of gonorrhœic conjunctivitis in adults by weak solutions of permanganate of potassium,** as suggested by Kalt. He prefers to treat ophthalmia neonatorum with silver nitrate and cold applications, but is inclined to give the preference in gonorrhœic conjunctivitis to permanganate of potash. He employs, not pure water, but a $\frac{3}{4}$ % solution of salt in water, and with this he makes a $\frac{1}{10}$ % solution of the permanganate. In other words, to a litre of weak salt solution, Leber adds 10 centimeters of a 1 % solution of the permanganate. This can be used three or four times daily.

11. LEBER: **A collection of fat in the anterior chamber.** A patient, aged eighty-two, and long since blind from glaucoma, had in the upper and lower corneal margins a peculiar yellow stripe which, on examination, was shown to be in the anterior chamber, and to consist apparently of fat, due, no doubt, to a former hemorrhage into the anterior chamber from an injury.

12. LEBER, on **The development of hyphomycetes in the vitreous** after a penetrating injury with a knife blade.

This paper was based on the condition of a juvenile eye enucleated for a corneal stab-wound,—incarcerated iris, degenerated traumatic cataract, and incipient phthisis of the globe.

The eye was hardened in formol, of which Leber speaks highly. There was no trace of exudation in the globe, but the thickened vitreous exhibited numerous hyphomycetes, light brown in color, very delicate, mostly ramified, and arranged in rows. The mostly uniform limbs were occasionally interrupted by short, bulging ones, and the brownish mycelium threads were now and then seen to be colorless. The threads formed a thick network, but there were no visible spores. The species could not be determined, and cultures were unsuccessful. The formol treatment had probably killed the hyphomycetes.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

MEETING OF MARCH 21, 1898, THE PRESIDENT, DR. E. GRUENING, IN THE CHAIR.

Dr. J. E. WEEKS presented a case of paralysis of all the nerves of the right eye except the fourth. Diagnosed by Dr. M. A. Starr as a case of **multiple neuritis,** with sclerosed plaques in the pons.

Dr. W. A. HOLDEN read a paper entitled **The clinical Value of bacteriological examination of the conjunctiva and cornea.** [Published in ARCH. OF OPHTHALMOL., vol. xxvii., March number.]

Dr. HAROLD GIFFORD read a paper on **Ophthalmic bacteriology with reference to Asepsis.** [To be published in full.]

In discussing Dr. Holden's and Dr. Gifford's papers, Dr. J. E. WEEKS said in part: Bacteriological examination is most valuable in atypical eye diseases. The micro-organisms sometimes present in the eye, in the one case do not produce anything; in another they do. In the clinical features of the cases there is often resemblance, as in acute conjunctivitis and in pneumococcus conjunctivitis. Here the microscopical examination reveals the difference.

He regards ophthalmic bacteriology as of very little value in operative work in reference to asepsis. He referred to the study of the pneumococcus in ophthalmology by Sattler in 1885, which excited little comment at that time. Subsequently Gasperini's experiments attracted universal attention. This investigator found in 25 cases of hypopyon keratitis that in 22 the pneumococcus was present. It is also common in dacryo-cystoblennorrhœa and in tenonitis. It has been found in several cases of panophthal-

mitis. In one case of pneumococcus panophthalmitis reported, meningitis supervened upon enucleation, followed by death. He referred to the virulence of different forms of the pneumococcus.

Dr. DE SCHWEINITZ was much interested to hear the results of Dr. Gifford's experiments to prove the futility of attempts to sterilize the conjunctival cul-de-sac, and believed with Knapp that surgeons should strive to change the conjunctiva, if irritated or congested, into a pale shining membrane by the simplest regimen. He doubted, however, whether surgeons would be willing to follow Randolph's advice to abandon conjunctival irrigation entirely, because it may reduce the number and perhaps the vitality of the organisms present.

Dr. de Schweinitz called attention to other sources of infection, viz., the skin surface in the neighborhood of the eyes, the rhino-pharynx, and the solutions of the alkaloids used in ophthalmic practice. He referred to a research which he had conducted in conjunction with Dr. E. A. de Schweinitz, of Washington, in which the various micro-organisms and fungi which infest these solutions were isolated and their virulency determined by injection into the anterior chambers of rabbits' eyes.[1] Like Dr. Gifford, he had found the pneumococcus in cases of conjunctivitis, but not so frequently as Dr. Gifford. The Weeks bacillus had not been found in any case of acute catarrhal conjunctivitis. This might be explained perhaps as an error of examination, or because none of the cases presented the typical clinical features of the Koch-Weeks bacillus conjunctivitis, which undoubtedly possessed features which were characteristic.

In a few observations Dr. de Schweinitz had found the pneumococcus, either alone or in conjunction with streptococci, as the apparently active agent in the production of sloughing ulcers of the cornea. In common with other observers, however, he had been unable to produce in the rabbit's cornea a typical serpent ulcer with the clinical characteristics of hypopyon keratitis.

Dr. de Schweinitz exhibited a series of rabbits' eyes showing the appearances in the cornea at different stages after inoculation with pure cultures of the pneumococcus. He had had no difficulty in producing typical pneumococcus conjunctivitis, provided a fluid culture was injected into the conjunctiva. This research, including also the experiments with streptococci, staphylococci, etc.,

[1] *Therapeutic Gazette*, September 15, 1893, and *Transactions of the College of Physicians of Philadelphia*, March 7, 1894.

was not yet complete, and therefore was not referred to in greater detail.

Dr. H. KNAPP said that pneumococcus ulcers were more or less common in practice. Ten years ago he was much impressed by a case of beginning inflammation from a foreign body, which had entered the eye the same day. A violent panophthalmitis had developed within twenty-four hours. He enucleated, and the whole interior of the eye contained a pure culture of the pneumococcus.

One case of Dr. Gifford's, where the eye had been lost owing to a defective needle, was very instructive. A number of disastrous cases of suppuration after discission had been reported. He himself had never had any permanently bad results after discission. In some cases he had seen more or less severe, but always transient, irritation, in one case even a puriform deposit in the anterior chamber, with tension, in which an iridectomy produced a prompt recovery, with very good vision. Another point of interest in Dr. Gifford's communication was his drainage of the anterior chamber when he saw pus on the lens capsule. Syringing of the anterior chamber and drainage deserve our attention, the benefit of which was manifest in a case of purulent iritis after extraction, a few weeks ago. The patient was ninety-one years old, and the eye collapsed profoundly after a smooth extraction. The next day the anterior chamber was restored, but its contents were muddy and the iris swollen. He opened the wound and let the aqueous out daily for ten days. The cornea remained intact, the anterior chamber became filled and clear, but the pupil was closed. Perception of light; Tn. This was the only case of infection in 110 extractions during the winter. If he should have another case in a feeble, very old patient, when the cornea collapses, he would inject a warm, sterile salt solution into the anterior chamber, to prevent the eye, when refilling, from sucking in secretion from the conjunctival sac.

Dr. H. D. NOYES said that the discussion to-night belonged to the bacteriologist, and in this direction he had nothing to contribute. In the more practical side of the treatment he had the feeling that certain facts in clinical experience can get some explanation in what has been said here. Free incision through the cornea, when infiltrated,—Sæmisch incision,—has a remarkable influence over the subsequent course. Another fact: In certain cases of this form of ulceration, especially when not very deep, iridectomy does much good. It is not easy to make out the chain of cause and

effect. Iridectomy is not a frequent method in his own experience. It possibly gets rid of pathogenic germs in the anterior chamber, and the lessened pressure may favor exosmosis of germs from the cornea. Its value is nevertheless a clinical fact; the explanation may possibly be the one suggested. The disastrous cases after secondary discission have always been those in which a severe inflammation had produced a dense membrane, requiring division. Possibly the discission calls into activity the germs latent from the first inflammation.

The CHAIRMAN said that he was much impressed with the results of Dr. Gifford's experiments, demonstrating the impossibility of sterilizing the conjunctiva. In two recent cases of his there was infection after cataract extraction. He reopened the wound, removed exudation with the forceps, and cauterized the wound, with satisfactory results. So that he can approve of the treatment suggested by Dr. Knapp in these cases.

Dr. HOLDEN said that he would not suggest a bacteriological nomenclature; he would, however, resort to treatment early, after the bacteriological examination, and thus anticipate.

Dr. GIFFORD said that he thought Dr. Knapp's suggestion of filling up the collapsed anterior chamber with sterile fluid a most excellent one.

Adjourned.

W. B. MARPLE, M.D.,
Secretary.

MISCELLANEOUS NOTES.

MEETING OF BRITISH MEDICAL SOCIETY. The annual meeting of the British Medical Association will be held at Edinburgh, from July 26th to 30th. ARGYLL ROBERTSON, President Section of Ophthalmology.

THE AMERICAN OPHTHALMOLOGICAL SOCIETY will meet at New London, Conn., Pequot House, July 20–21, 1898.

THE WESTERN OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL ASSOCIATION (President, Dr. B. E. FRYER, of Kansas City) held a very successful meeting—the fourth annual—at Chicago, April 7–8, 1898. About one hundred physicians attended the meeting, and about twenty-five applied for membership. The ophthalmic papers and discussions are to be published in the *American Journal of Ophthalmology*. The next meeting will be in New Orleans, just before "Mardi Gras," 1899. President, Dr. J. E. COLBURN, of Chicago.

CORRECTION.—In the January number, 1898, of these ARCHIVES, p. 144, it is stated that Dr. Harper, of the Chicago University, will succeed Dr. E. L. Holmes, of the Rush Medical College, which is to be united with the University. This is only partially correct. Dr. Harper, the President of the Chicago University, will *ex officio* succeed Dr. Holmes as President of Rush Medical College, but the professorship of Ophthalmology and Otology has been conferred upon Dr. F. C. HOTZ, of Chicago. We congratulate both the University and Dr. Hotz upon the appointment.

edies, and instruments, and to discuss in a progressive, yet conservative spirit all questions of present importance.

The ARCHIVES contain exclusively original papers on all branches of Ophthalmic and Aural Surgery, and original reports on the progress of Ophthalmology and Otology throughout the world. The original papers occupy about three-fourths of the space, and their scope embraces all subjects of scientific and practical interest in the departments of Ophthalmology and Otology.

Special attention is paid to the preparation of the Reports on the Progress of Ophthalmology and Otology. These Reports are intended to furnish *complete, systematic, and early reviews* of the current Ophthalmological and Otological literature of the world, and the work of preparing them is divided among a specially selected number of collaborators.

Under the heading of "Miscellaneous Notes" there will be published all kinds of professional news that concerns the Oculist and Aurist, *e.g.*, appointments, honors, resignations and vacancies, new ophthalmic and aural hospitals, prize questions and essays, announcements of Society meetings, etc.

Each volume contains besides a specified table of contents, an index of subjects and authors, both of the original papers and the reports, and a general index of the preceding seven years is added to every seventh volume.

Original papers of value from any source are solicited.

Communications for the English edition of the ARCHIVES OF OPHTHALMOLOGY should be addressed to DR. H. KNAPP, 26 West 40th Street, New York, those for the ARCHIVES OF OTOLOGY either to DR. H. KNAPP, or to DR. U. PRITCHARD, 26 Wimpole Street, W., London, England.

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EDITORIAL NOTE.

In asking for continued support of the ARCHIVES from subscribers and contributors, the Editors offer no new program, but point to the record of the work that has been accomplished during the past twenty-eight years. At the first appearance of the ARCHIVES in 1869, they constituted the only periodical of their class in America, and had only a few predecessors in Europe. The international character of the ARCHIVES was a novel and distinctive feature.

The original program of the ARCHIVES to publish only original papers in semi-annual independent numbers has, in the course of years, been extended by the addition of reviews of the current ophthalmological and otological literature.

With the eighth volume, in 1879, the combined ARCHIVES, issued semi-annually, were divided into two separate journals, issued quarterly, and each of about the same size as the combined journal, and the reviews were converted into quarterly reports, systematic and comprehensive, though concise, on the progress of ophthalmology and otology.

Since that date, the ARCHIVES have developed into an extensive and conveniently arranged storehouse of knowledge for the instruction of the student and for reference by the practitioner and the investigator.

For more than ten years, the valuable material offered to the ARCHIVES has been so abundant that it has not been practicable to utilize for the English edition the full series of papers from the German, or the converse. Many articles had to be abridged, while of others abstracts only could be printed. Any one of our readers could, however, have secured, and can secure in future, from the American editor, or the German publisher, the loan of the original papers presenting the complete text.

It is the purpose of the editors to arrange, in the department of Reports, for the review of every publication which in their opinion contains material that can be called distinctive and important. It is, of course, impossible, within the limits of the ARCHIVES or of any similar journal, to give attention to every publication in their department of science. We may state further that it is not a part of our program to furnish a complete report on the *bibliography*, but only on the **progress** of ophthalmology and otology.

Though the systematic arrangement of the reviews is of importance for reference and comprehensive information, we shall publish, as early after the meetings as practicable, reports of the proceedings of societies, always bearing in mind that the ARCHIVES are not intended to be only a repertory of knowledge, but also a journal of news.

It is natural that the English edition of the ARCHIVES should give the advantage of time and space to Anglo-American contributors over the German, and *vice versa*. It is evident, however, that the association of the two editions lends strength to each, furnishing to the authors a wider circulation for their papers, and to the readers a larger and more diversified field of information.

ARCHIVES OF OPHTHALMOLOGY

NOTICE TO OUR READERS.

The ARCHIVES OF OPHTHALMOLOGY contain *original papers* on all branches of ophthalmic surgery, and *original reports* on the progress of ophthalmology. The original papers occupy from two thirds to three fourths of the space, and their scope embraces all subjects of scientific and practical interest connected with this department of medicine.

The object of the ARCHIVES is to guard, solidify, extend, and diffuse the stock of acquired ophthalmic knowledge by recording the constant addition of new observations, investigations, methods and means of examination, clinical experience, instruments and remedies, and further by taking part in the discussion of the questions of the day with a spirit alike conservative and progressive.

Particular attention is paid to the preparation of the Report on the Progress of Ophthalmology. The report is intended to furnish a *complete, systematic, and early* review of the current ophthalmological literature of the world. It has been necessary to divide the work of its preparation among a number of collaborators according to the following arrangement:

Dr. ST. BERNHEIMER, of Vienna.

1. *General Ophthalmological Literature:*
   a.—Text-books (not abstracts, but notes pointing out what is new and characteristic).
   b.—Monographs and papers on historical, statistical, and general subjects; reports on societies and hospitals.
   c.—Periodicals on our specialty (short notices of their character, time and place of publication, the titles of the original papers, with the names of their authors).

2. *General Pathology, Diagnosis, and Therapeutics*, including new instruments, apparatus, and remedies.
3. *Normal Anatomy and Physiology*, including color-blindness.

Dr. C. HORSTMANN, Prof. at the University of Berlin (Potsdamer Strasse 4):

1. *Anomalies of Refraction and Accommodation.*
2. *Eyelids.*
3. *Lachrymal Apparatus.*
4. *Muscles and Nerves.*
5. *Orbit and Adjacent Cavities.*
6. *Conjunctiva, Cornea, Sclerotic.*
7. *Injuries and Foreign Bodies of these parts.*

Dr. P. SILEX, Lecturer at the University of Berlin.

1. *Uveal Tract*, including glaucoma.
2. *Refracting Media*, including the lens.
3. *Retina and Optic Nerve.*
4. *Injuries and Foreign Bodies of these parts.*
5. *Ocular affections in connection with general diseases.*

In order to obtain complete and recent reviews on the non-German ophthalmological literature, special reporters have been selected for different countries, who will send monthly abstracts of all local ophthalmological publications to Dr. C. Horstmann, of Berlin, the editor of the Report. Dr. Horstmann will distribute these abstracts among the German reporters according to the above plan, in order to preserve the systematic arrangement which we think of paramount importance.

The special reporters are:

For America: Dr. SWAN M. BURNETT, 916 Farragut Square, Washington, D. C.

For Great Britain and Ireland: Dr. L. WERNER, 31 Merrion Square North, Dublin.

For France and Belgium: Drs. D. E. SULZER, 22 Rue de Tocqueville, Paris, and P. VON MITTLESTÄDT, Metz.

For Germany: Drs. BERNHEIMER, Vienna, HORSTMANN, SILEX, and DEUS, in Berlin.

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For Russia: Prof. HIRSCHMANN, Charkow.

For Scandinavia: Drs. OLE BULL and SCHIÖTZ, Christiania.

For Holland: Dr. C. A. H. WESTHOFF, of Amsterdam.

In the interest of our readers, who are scattered over the whole world—and whom, like ourselves, we desire to keep informed of all advances in ophthalmology,—furthermore in their own interest, authors of ophthalmological works are requested to send reprints, duplicates of journals, or copies for reviewing, to one of the above-named reporters, or to the editors or publishers of the Archives, according to their convenience.

The abstracts of American ophthalmological literature formerly appeared under a special head, but are now embodied in the systematic Report. Text-books may be specially noticed.

The number of good papers offered us for publication has increased to such an extent that it is no longer possible to translate all of them unabridged. Whenever a German paper is condensed in the English version, or *vice versa*, it will be so stated. Should any one of our readers wish to recur to the original, the editors will always take pleasure in sending it for reference.

Under the heading of "Miscellaneous Notes," there will be published all kinds of professional news which specially concern the oculist, *e. g.*, appointments, honors, resignations, vacancies, new ophthalmic hospitals, opportunities for instruction, prize questions and essays, announcement of Society meetings, etc. Brief notices of this kind will be thankfully received by the editors.

Original papers of value from any source will, as heretofore, be welcome to the ARCHIVES, and are solicited.

EDITORS:

H. KNAPP, M.D.,
26 WEST 40TH STREET, NEW YORK.

C. SCHWEIGGER, M.D.
ROONSTR. 6, BERLIN.

NOTICE TO CONTRIBUTORS.

The editors and publishers of the ARCHIVES beg to offer some suggestions to authors who propose to favor them with their contributions.

1. As original communications the ARCHIVES can accept only such papers as have never been printed nor are intended to be printed in other journals. If a preliminary communication on the subject of a paper has been published, the author is requested to state this in the letter accompanying his manuscript. It is understood that contributors to these ARCHIVES and editors of other periodicals will make no abstracts of the original papers published in this journal without giving it due credit for the same.

2. Authors will receive gratuitously twenty-five reprints of their articles. If a greater number is desired,—notice of which should be given at the head of the manuscript,—only the additional cost of presswork and paper will be charged to the author.

3. In preparing manuscript for the compositor it is requested that the following rules be adhered to:

a. Write on one side of the paper only.

b. Write without breaks, *i. e.* do not begin a new sentence on a new line. When you want to begin a new line or paragraph at a given word, place before it in your MS. the sign ¶.

c. Draw a line along the margin of such paragraphs as should be printed in smaller type—for instance, all that is clinical history in reports of cases, etc.

d. Words to be printed in *italics*, should be underscored once, in SMALL CAPITALS twice, in LARGE CAPITALS three times.

4. Authors may receive proofs for revision if they will kindly return them without delay. We beg however to remind our contributors that changes in the copy are equivalent to resetting, causing so much additional expense. We therefore request them, to make, if possible, no alterations at all in their MSS., or, at least, to limit these to what is of essential importance.

JUST PUBLISHED

Electricity in the Diagnosis and Treatment of Diseases of the Nose, Throat and Ear

By W. SCHEPPEGRELL, A.M., M.D.

Ex-Vice-President American Laryng., Rhin. and Otol. Soc.; Vice-President Western Ophthalmologic and Oto-Laryngologic Ass'n; Late Asst. Surgeon to the Eye, Ear, Nose and Throat Hospital, New Orleans; Vice-President New Orleans Electric Soc.; Co-Editor *Annals of Otol., Rhin. and Laryng.*; Associate Editor *The Laryngoscope*; Collaborator *The Revue Internationale de Rhin., Otol. et Laryng.*; Member the American Academy of Medicine, etc.

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This is the first systematic treatise on the application of electricity in the diagnosis and treatment of diseases of the ear and upper respiratory passages. The superficial manner with which this subject has been treated in text-books in general has encouraged the author to publish this practical work, which in addition to the original research gives a careful review of the subject to date.

Attention is first called to the importance of a thorough knowledge of electro-physics and of electro-therapy in general, the first portion of the work being devoted to this subject. The application of electricity in the diagnosis and treatment of diseases of the nose, throat and ear is then described in detail.

This work is not limited to the direct effects of electricity only, but embraces also the mechanical and thermic effects; the mechanical contrivances, such as drill motors, mechanical saws and instruments for vibratory massage, and the various electro-cautery appliances, receive due attention.

As a preliminary to the mechanical methods of vibratory massage, the whole subject of vibratory massage in the treatment of diseases of the nose, throat and ear is fully discussed. Illumination and transillumination of the respiratory passages and accessory cavities are exhaustively treated. The electric reaction of the auditory, gustatory and other nerves is fully described, and two chapters are devoted to the application of electricity in malignant and non-malignant tumors.

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The book contains a full bibliography of the subject, and the works and journals referred to alone occupy 21 pages. A complete index of authors and of subjects concludes the volume.

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